News of the Industry Begins Page 113

AUTOMOTIVE INDUSTRIES

LAND AIR WATER

Volume 68
Number 4

PUBLISHED WEEKLY AT CHESTNUT AND 56TH STREETS
PHILADELPHIA, JANUARY 28, 1933

$1.00 a year
25c a copy

WHEN IN DOUBT

When in doubt about which automobile or motor truck to buy, a study of the bearing equipment will help you to make a wise decision.

If you find Timken Bearings at the points of hard service—front wheels, rear wheels, transmission, pinion, differential, fan, steering pivots and steering gear—you have assurance that you are buying many extra thousands of miles of economical, safe, trouble-free service. This longer life is made possible by the exclusive Timken combination of . . .

1—Tapered construction, with its ability to carry both thrust and radial loads;

2—Positively aligned rolls, which keep the bearing at maximum efficiency constantly;

3—Precision assured by a factory where millions of dollars are invested in the most accurate gauges and machinery known to modern manufacturing science;

4—Timken-made, special alloy steel, the most enduring material ever developed for anti-friction bearings.

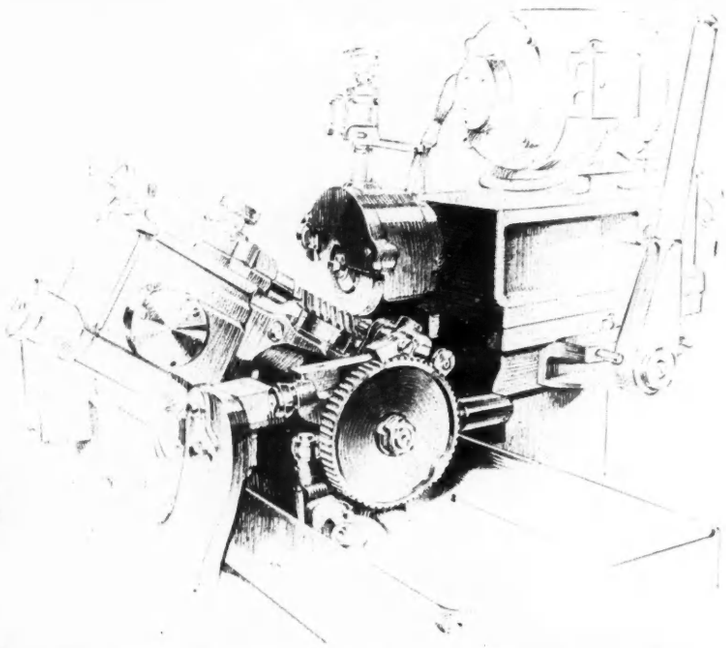
"Timken Bearing Equipped" is one of the most important points to look for in buying any type of automobile vehicle. The Timken Roller Bearing Company, Canton, Ohio.

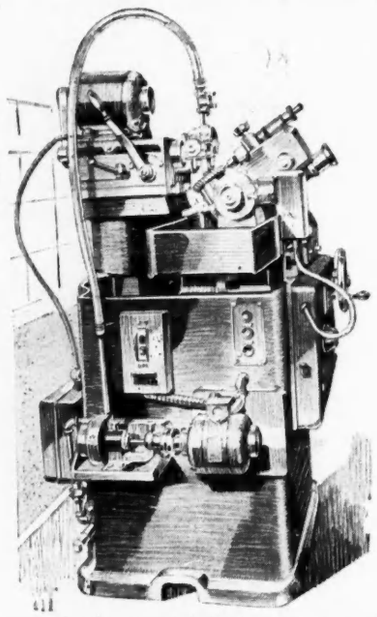
TIMKEN
Tapered
ROLLER BEARINGS

Entered as second-class matter Oct. 7, 1925, at the post office at Philadelphia, Pa., under the Act of March 3, 1879

Avoid Human Fallibility

The Fellows HELICAL CUTTER SHARPENING MACHINE is *Automatically* CONTROLLED!..





Accurately sharpened helical cutters are absolutely essential to the production of GOOD GEARS. This Fellows Automatic Helical Cutter Sharpening Machine affords another measure of complete control.

All the operator has to do is to (1) clamp the cutter on the spindle and (2) feed the wheel down to the work. Any operator can do perfect work. The indexing and reciprocation of the cutter for tooth-to-tooth spacing are automatic, and the machine stops when the cutter has been resharpened. . . . Every user of Helical Cutters should have one or more of these machines, which will both save money on resharpening and avoid the losses incident to using cutters in poor condition. . . . A hand-operated sharpening fixture cannot compete with this machine's Greater Accuracy, Higher Speed and Positive Control. For details write: The Fellows Gear Shaper Company, Springfield, Vt. (or Detroit office: 616 Fisher Building).

FELLOWS
~ GEAR SHAPER ~
METHODS

AUTOMOTIVE INDUSTRIES
THE AUTOMOBILE

Volume 68 Number 4

Reg. U. S. Pat. Off.

NORMAN G. SHIDLE, Directing Editor

LESLIE PEAT, Managing Editor
P. M. HELDT, Engineering Editor ATHEL F. DENHAM, Field Editor
JOSEPH GESCHELIN, Eng. Editor HERBERT HOSKING, News Editor
GEOFFREY GMIER, Art Editor

Contents

Ratio of Automotive Use of Steel Gains in 1932. By William Crawford Hirsch 93

Just Among Ourselves 95

Body Styles Displayed at New York Show Offer an Interesting Study in Trends. By Joseph Geschelin 96

1932 in the News 100

Cummins Diesel Produced by Automotive Methods. By Joseph Geschelin 102

Rear-Powered Ultra Modern Bodies 106

G. M. T.'s Have New Engines 107

Dodge Commercial Bodies Follow Passenger Car Lines 109

Brake Booster Operated by Gases of Combustion 111

Automotive Oddities 112

News of the Industry 113

New Developments 121

Advertisers' Index 40

Automotive Industries is published every Saturday by

CHILTON COMPANY

Chestnut and 56th Streets, Philadelphia, Pa.

C. A. MUSSELMAN, President and General Manager
J. S. HILDRETH, Vice-Pres. and Director of Sales
W. I. RALPH, Vice-Pres. G. C. BUZBY, Vice-Pres.
A. H. VAUX, Secretary and Treasurer
JOHN A. CLEMENTS, Asst. Treasurer
JULIAN CHASE, Business Manager GEO. D. ROBERTS
Automotive Industries Advertising Manager

Cable Address ..... Autoland, Philadelphia
Telephone ..... Sherwood 1424

OFFICES

New York—U. P. C. Bldg., 239 W. 39th St., Phone Pennsylvania 6-0080
Chicago—367 West Adams St., Phone Randolph 9448
Detroit—710 Stephenson Bldg., Phone Madison 2090
Cleveland—1140 Guardian Bldg., Phone Main 6860
San Francisco—1045 Sansome St., Phone Douglas 4306
Los Angeles—Room 651, 1206 Maple St., Phone Westmore 6477
Portland, Oregon—72 Fifth St.

Controlled by United Business Publishers, Inc., 239 W. 39th St., New York; ANDREW C. PEARSON, Chairman, Board of Directors; FRITZ J. FRANK, President; C. A. MUSSELMAN, Vice-President; F. C. STEVENS, Treasurer.

SUBSCRIPTION RATES: United States, United States Possessions, and all countries in the Postal Union, $1.00 per year; Canada and Foreign, $4.00 per year. Single Copies 25c.

COPYRIGHT, 1933, CHILTON COMPANY

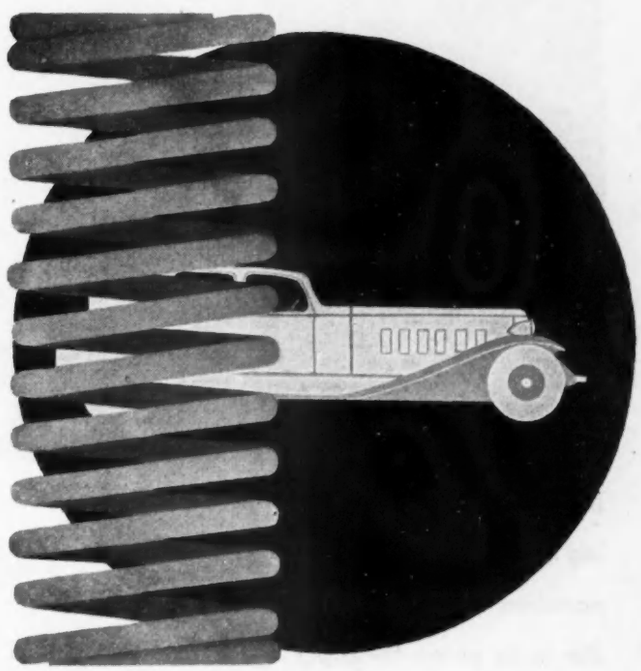
Member of the Audit Bureau of Circulations
Member Associated Business Papers, Inc.

Automotive Industries—The Automobile is a consolidation of the Automobile (monthly) and the Motor Review (weekly), May, 1902; Dealer and Repairman (monthly), October, 1903; the Automobile Magazine (monthly), July, 1907, and the Horseless Age (weekly), founded in 1895, May, 1918.

PERFORMANCE THAT INSPIRES CONFIDENCE

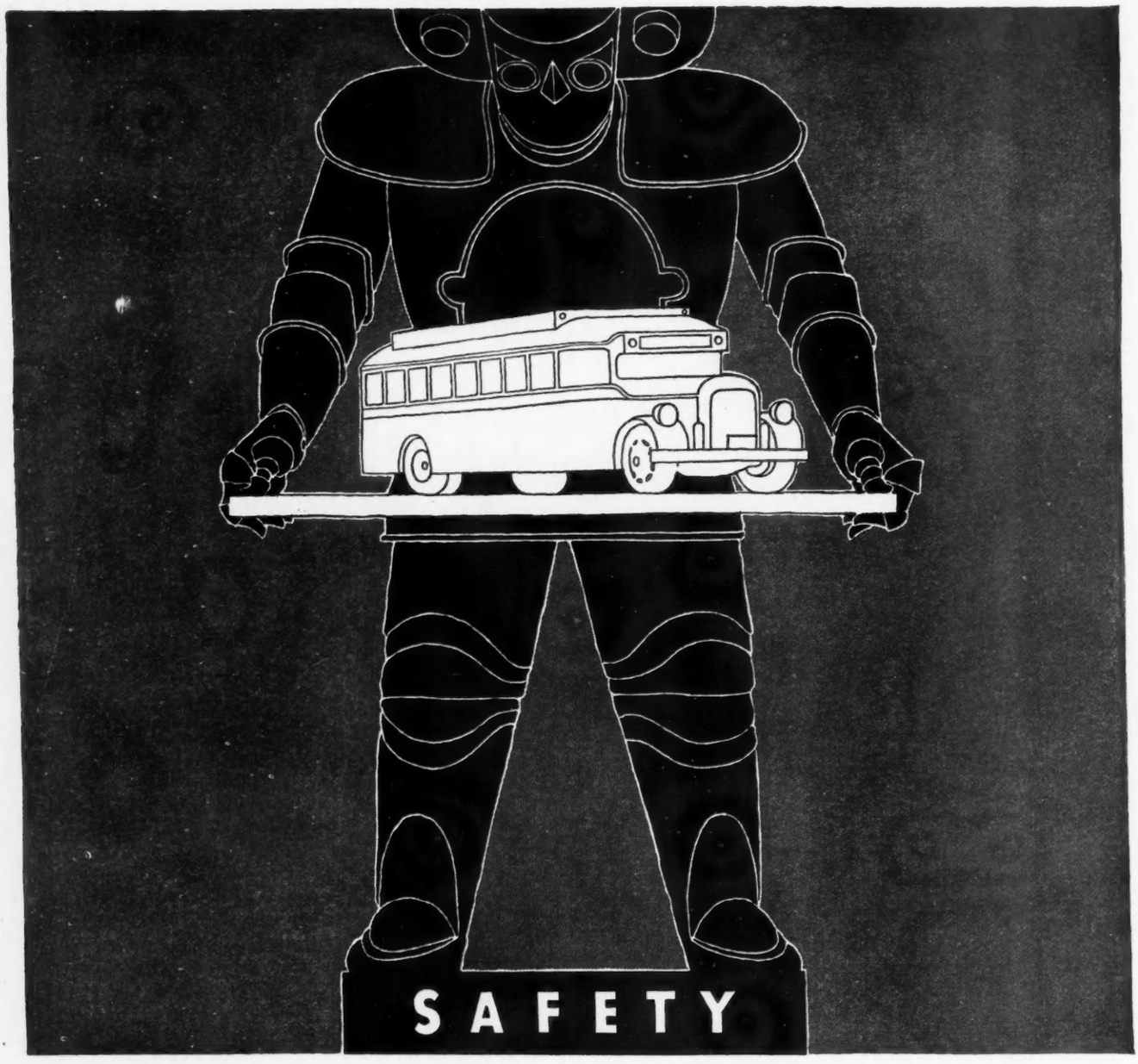
RAYMOND SPRINGS

The same qualities that have made RAYMOND SPRINGS successful in general industrial use—make them confidently accepted by manufacturers of automobiles and accessories . . .



For inquiries or estimates on COIL SPRINGS, Wire Specialties and Small Metal Stampings . . . in all materials or finishes, call on . . .

RAYMOND MANUFACTURING CO.
CORRY • PENNSYLVANIA



Instantly controllable, the modern Air Braked coach represents the utmost in transportation safety ★ Borrowing the time-tested, basic principle of control which has featured the evolution of all forms of rail transportation throughout the past half century, today's motor coach is directly comparable to the trimmest roadster in its power-to-stop ★ More important still, is the fact that Air Brake equipment is now available which assumes control, automatically, in emergencies. This feature is a recent and exclusive development of the Bendix-Westinghouse Company, whose Automotive Air Brakes are the recognized safety standard with practically every important coach operation throughout the world. Detailed information regarding the many advantages of modern Air Brake control may be had by addressing the BENDIX-WESTINGHOUSE AUTOMOTIVE AIR BRAKE COMPANY at PITTSBURGH, PENNSYLVANIA.

BENDIX·WESTINGHOUSE

AUTOMOTIVE AIR BRAKES

AUTOMOTIVE INDUSTRIES

Vol. 68, No. 4 • THIRTY-FIFTH YEAR • January 28, 1933

Photo by John P. Mudd for the Midvale Co.

Ratio of Automotive Use of Steel Gains in 1932

by William Crawford Hirsch

PERHAPS never before has one year's history of the metal markets been of quite such doubtful value as a compass for the year to follow as was that of 1932. Patrick Henry's dictum, "I know no way of judging the future but by the past," must be modified in any attempt to appraise the outlook, so as to minimize the false background of a year that was so abnormal as was 1932. A year in which steel production dwindled to between 13,000,000 and 14,000,000 tons from the previous 20-year average of 40,000,000 tons is even less useful as a criterion than was the banner year of 1929 when American steel production soared to 55,000,000 tons. Pig iron production of approximately 9,000,000 tons in 1932 was less than one-

In a buyer's market which has lasted so long there is a disregard for possible sudden changes. With the close figuring of today a few dollars a ton rise in price is serious

third of the previous 20-year average, and the average for a century even makes a better showing, because, beginning with the year of the Spanish-American War, production never fell below 10,000,000 tons. In charting his course for 1933 the automotive buyer of iron and steel products will do well to bear in mind the exceptional character of the preceding year's market conditions. He may have to steer by dead reckoning, by intuition, for some time to come, but this will probably serve him better than the will-o'-the-wisp of last year's statistics.

With building and construction demand for steel confined largely to public works and the railroads taking relatively little in the way of rails and other steel products, the leadership of the automotive industries as consumers of steel has become even more pronounced during the steel industry's famine period. Not a few steel statisticians are chronic sinners by way of underestimating the steel tonnage going into automotive consumption. Automotive demand absorbs approximately one-third of all sheets rolled and three-fifths of the total output of strip mills. Automotive consumption also accounts for one-third of the output of the heavier forms of rolled steel: bars, shapes and plates. These ratios, if they underwent any change at all in 1932, did so in an upward direction and, all in all, last year's developments served to confirm the impression that one-fifth of the entire output of rolled steel goes into automotive consumption, putting automotive manufactures at the head of the list.

Distorted as the picture of the 1932 steel market as a whole is by reason of the abnormal decline in the general demand, the price movement in those descriptions of finished steel that find their preponderant use in automotive manufactures clearly reflects the steel industry's competitive eagerness for automotive business. Body stock could be bought in December for $3 to $5 a ton less for corresponding material than in January. With representative business lacking in so many descriptions of steel, the market's price structure as a whole shows very little change. It is a rather healthy symptom that there was a price movement in those descriptions of flat steels of which automotive manufacturers are the outstanding consumers. In passing, it may be noted that one of last year's developments was the buying of body stock on the basis of full cold rolled sheets and the consequent decline in importance of quotations for automobile sheets. The thought persists in some quarters that the shrinkage in the spread between semi-finished and finished flat steels is the natural sequel of further economies made possible through automatic rolling equipment and rationalization of finishing procedure as well as a mild readjustment of wage scales. In a period in which nearly all units in the steel industry are operating at a loss it is difficult to determine to what extent the consumer may reasonably expect to benefit from technical and other economies which necessity has forced the producer to introduce.

A market in which the buyer has had the upper hand for so long as has been the case in that for steel is apt to breed disregard for the possibility of sudden changes. These may not come in 1933, but they are more likely than not to come some day. There was a time when a few dollars per ton advance in the price of finished steel was not quite so painfully felt by the automotive consumer as today. He resisted every advance, as buyers naturally will, but the selling price of his finished unit allowed for a certain variation in cost. With the close figuring in vogue today among motor car manufacturers and by them passed on to their parts-makers, a few dollars per ton change in the price of body stock or the material for other motor parts is a far more serious matter. While there is nothing in the offing to make any sharp change in steel prices a nearby probability, it may be well to weigh the possibility of such changes in a more cautious frame of mind than reflected by the many recent price-cuts in retail car prices.

In the field of automotive alloy steels the chromium steels of the "stainless" sort continue to attract outstanding attention. The consumption of alloy steels is well maintained, proportionate of course to the general shrinkage in steel consumption, but for all that reflecting the tendency toward the use of more and more quality steels.

Automotive foundries, other than those of the large motor car manufacturers who do protect themselves by long-time contracts or in some other way, have become so used to purchasing their pig iron requirements in single carload lots without suffering from any advances thereby, that here, too, some thought may be given to the adage that it's a long road that has no turn.

It is in the market for non-ferrous metals that last year brought the most startling changes. Copper declined from 7¼ cents in January to 5 cents in December. In June it was possible to buy Straits tin at 18.35 cents, the record low for the century. Lead dipped to as low as 2.65 cents, New York, and zinc to 2½ cents, East St. Louis. The very fact that before the close of the year all of the white metals had made appreciable recoveries suffices as a warning sign not to place too much faith in the long continuance of abnormally low price levels. It is quite true that there is a very large accumulation of copper that must be disposed of before the copper industry can again resume normal functioning. It is also true that South African production has increased by leaps and bounds and that the dominant position of the United States as the world's leading copper producer is being more and more seriously challenged from year to year. But granting all these adverse conditions, 5 cent copper must be looked upon as an ephemeral phenomenon.

Nineteen hundred and thirty-three may prove, as so many expect, nothing more than a stop-gap between a period of abnormally low business activity and the resumption of a more orderly state of affairs, but it will be a year that will call for the utmost vigilance. The danger lies in accepting the follies of 1932, such as 5-cent copper, as normal.

JUST AMONG OURSELVES

No Sales Upsets This Year

"WELL, how does the situation look to you, now that you have seen all the new models and had a chance to nose around a little outside?" we asked the Old Timer as he hailed us on 5th Ave. the other morning, while we were taking the Long Wait for the light to change and let us transverse that famous street from east to west.

"I was hoping you'd ask," he beamed, "because I'm just full of opinions again and I was afraid nobody was going to ask me for them this year."

"Allright, let's have a few," we encouraged, one eye still on the traffic signal.

"Well, the main one is that there aren't going to be any big upsets in the automobile business this year. There may be some switching of position among the fellows who were out ahead last year, but I doubt that newcomers or oldcomers are going to upset the batting order seriously. . . . I know you won't dare print that, even though it isn't your own opinion, but I'm telling you just the same. . . .

"Why am I so positive? Just because I'm an opinionated old duck, I guess. But you know, in twenty-five years of attending automobile shows, it's been remarkable to me how accurately one could pick the winners—and losers—in about an hour's tour of Grand Central Palace. And this year some of the hits of the show were cars built by the biggest and oldest makers. When you tie a show 'hit' to a big, powerful dealer organization, you've got a combination that's hard to beat. . . . Ford? I don't know exactly what he will have, of course, but you can put it down as my opinion that Ford will not lead in total sales in 1933."

Then the light changed. We rushed off—and began wondering how nearly right the Old Timer might turn out to be.

Buyers Still Dozing

THREE weeks of January have passed. Philadelphia, Cleveland, Detroit and other shows have followed on the heels of the New York opening. Chicago is about to begin.

Sales reports are beginning to filter through. Business still is lethargic. Here and there particular lines have made exceptional showings. The public has looked eagerly at all the shows. But business still is lethargic. The year 1933 has not opened with a bang.

There is yet hope that a settling of international problems, spring weather and the impetus of desire brought to fruition by the shows will develop conditions which will react favorably to the powerful selling effort which the industry will continue to put forth.

Streamlining a "Natural," But—

DURING New York Show week, we talked separately with two of the leading engineers of the automobile industry about the trend toward streamlining. Both men, could I name them, would be recognized as successful, respected, able. Neither is directly associated with companies which have gone very far toward radical streamlining.

"Streamlining," said one—the younger by the way—"is coming with a rush. It's a natural. Besides all of its technical advantages, it brings a functional beauty that finally will appeal to everybody. The streamlined form is essentially a beautiful form. In order to get the real advantages out of streamlining, it will have to be combined with an overdrive in the rear axle. Engine position? Oh, I think the engine will eventually go to the rear. You have to have the big tail for streamlining and it makes a natural place for the engine."

And just a few hours later, we heard something like this from the other technical authority. "The streamlined form is essentially ugly. You can't get away from that, and I don't think you can ever get the public to like it.

"The claimed advantages, to my mind, are more conversational than actual in many respects. You don't begin to get any material advantages from decreased air resistance until you are far above normal driving speeds, and when you attempt extremely high speeds, you run into engine speed problems that have nothing to do with air resistance. . . ."

Undergoing Practical Tests

WHILE the arguments about streamlining continue—and they will continue for several years hence—some really practical work is going forward to determine what actually happens to automobiles under different wind conditions on the road. Definite, proving ground sort of tests on the practical effects of streamlining, are finally being added to the wind-tunnel and theoretical work on which a large part of past discussion has been based.

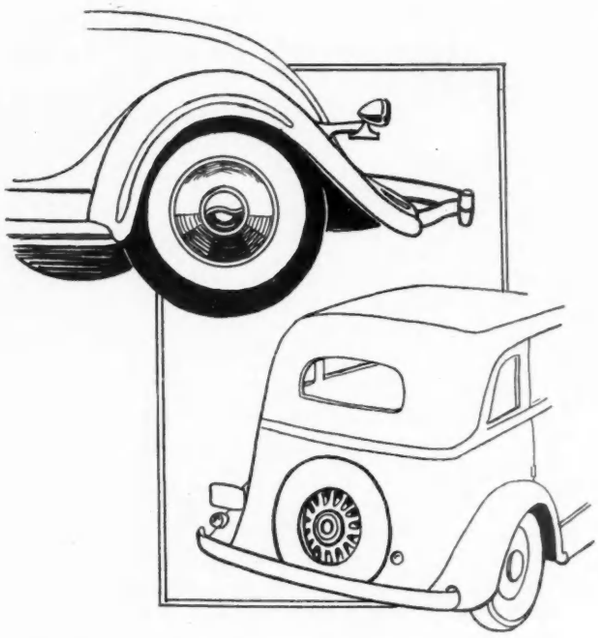
We haven't been able to find out yet what has been learned from the first of these test expeditions, but we'll warrant that it has been plenty.—N.G.S.

Body Styles Displayed at New York Interesting Study in Trends

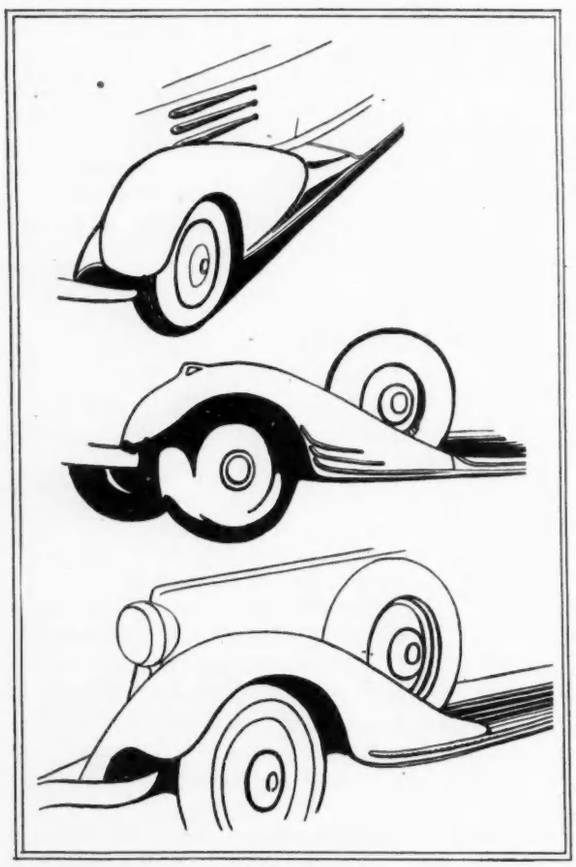
FLANKED on the right by the radical lines of the Silver Arrow, on the left by the Continental flavor of the Willys, the body styles displayed at the New York Show offer an interesting study in contrasts. Creative design coincident with the advance in the art of metal stretching has molded sheet metal into unaccustomed forms.

It took only a casual trip around the exhibits to sense that practically every car whether of high or low degree had followed a definite general trend—two or three car builders evidently refused to be stampeded and their product stands out in bold relief.

Although in detail the lines of different makes of cars show variations, a number of unmistakable trends are plainly evident. Briefly, these include inclined radiator fronts, usually of V-type; sloping windshields with well-rounded corners at the header, visorless in all cases; larger, deeper fenders with skirts at the front and rear; elimination of the bright cowl band and cowl side lamps; more careful attention to the fairing of sheet metal joints.



The trend toward the elimination of prominent hub caps has been effectively worked out on the Hupmobile shown in the upper sketch. In the sketch below it Willys has employed a Continental touch by the rear spare within the back panel



Oldsmobile fenders, shown in the upper sketch have gone all the way and are heavily skirted, while Pontiac carries out its scheme by a series of three ribs on each fender which helps to stiffen it. The lower of the three sketches shows the fender on the Graham with the line of the running board carried along the bottom of the fender skirt

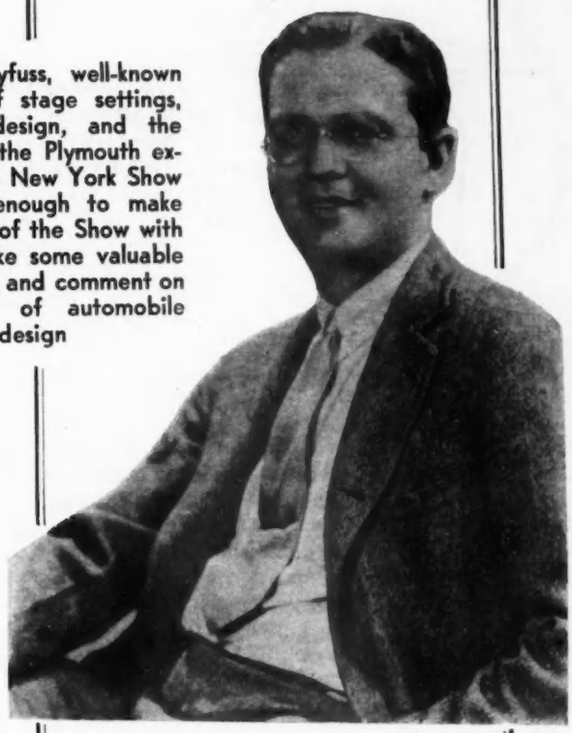
Color treatment has entered a new phase. This year very few jobs feature three-color combinations, while the fenders are almost invariably of the body color or some contrasting combination. The battle between chromium plate and color for radiator shells still seems to be a draw with no definite trend indicated at the moment. However, several makes, particularly Graham and Oldsmobile, have achieved such a handsome color harmony through the blending of colored radiator shell and colored lamp bodies that their work has attracted the admiration of many visitors.

Pearl essence appears to have lost ground at least so far as show models are concerned. However, Graham still continues this type of finish in some very attractive combinations of depth and lustre achieved by varying the proportions of the essence.

A survey of bodies this year would be incomplete without mentioning ventilation, which has attracted so much attention to the General Motors line. This ventilating system is a development of Fisher Body.

Show Offer An

by Joseph Geschelin



Henry Dreyfuss, well-known designer of stage settings, industrial design, and the creator of the Plymouth exhibit at the New York Show was kind enough to make the rounds of the Show with us and make some valuable suggestions and comment on the trend of automobile design

He is impressed by the fact that creative design is approaching the ideal of expression in line and form rather than through decoration and involved color schemes. He feels that good design is functional and aims at economy of space by expedients such as flush type hardware, flush head lamps, inset license plates, and in short, the general cleaning up of exterior fittings and projections consistent with good streamline forms

●

Some of these concepts found their way into the article which was published in Automotive Industries, October 1, 1932. Among other things, this article pointed out the means of blending wheel forms into the general lines of the body through the use of a simple disc embracing the hub cap with its distinctive design. Hupmobile and Cadillac V-16 have used this style of treatment very effectively

However, another type has been introduced simultaneously by Dole and was shown on several makes at the show.

Speaking of body design, how many noticed that the Silver Arrow has an all-metal deck? Interestingly enough, this roof treatment blends so well with the general sweep and color of the body that one is not conscious of the roof at all, which is one of the arguments advanced by its proponents for many a year. However, this type of roof demands special soundproofing treatment if drumming, and reverberation are to be avoided. But this needn't be a serious problem what with our present knowledge of noise and its control.

Zinc has become an almost universal medium for expressing design in ornament, body hardware, and numerous attachments whether bright plated or enameled. Practically all radiator ornaments are of die-cast zinc; the same is true of most door handles, various kinds of brackets, knobs, etc. Several horn projectors and an adjustable die cast door strike also have made their appearance.

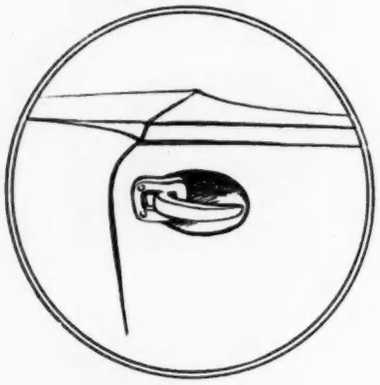
So far we have dealt with the quick impressions of the obvious trends expressed in 1933 body lines. Let us examine the finer details that identify the work of different designers, as discussed briefly under the topical headings below.

FENDERS—Are going places this year, provided they keep out of physical contact with other fenders. They represent a real achievement in metal stamping, something that would have been impossible several years ago. Oldsmobile has gone further than anyone else in carrying out the present trend. Front fenders are deeply crowned, so much so that there is a distinct formation line defining the junction of the crown and running board apron. The fender skirt is deep and terminates in a square corner.

Oldsmobile and Buick both feature fender gutters formed along the outside edge well inside the fender line. Here is a hidden feature that might well be emphasized in literature going to the buyer. Budd is said to have introduced this construction in Europe about 18 months ago. It is expected that the gutter will help to keep the edge of the fender clean in somewhat the same fashion as the rolled edge on the Reo Royale.

Oldsmobile has gone the whole way on its rear fenders. They are heavily skirted, and, on the sedan model, fair in with the skirt continuing below the back panel so as to form a continuous sweep clear across the rear end of the body and out to the fenders.

Henry Dreyfuss particularly admired the treatment



The flush top door handles on the Silver Arrow are an innovation

of line on the Graham. They carry a bright molding strip across the edge of the running board, which is continued part way along the edge of the front fender skirt and up around the curve at the front end of the rear fender. This is a particularly effective means of expressing line.

Reo has done a clever piece of work in masking the fact that the skirt is a separate piece by stamping a panel effect in the skirt. Thus the parting line becomes a part of the panel and no one looks any further unless they are as inquisitive as we were.

Pontiac stamps a series of three ribs on each fender skirt and thus achieves not only the needed stiffness but also carries out the design idea expressed by the feathers on the big chief's headdress. Incidentally, every designer seems to have realized the necessity of strengthening the fender skirt not only as a safeguard in collisions, but also as a precaution against drumming. In most cases a bracket of some kind has been provided although some of these do not deem it to be very effective against side loads. Buick fenders appeared to have unusual stiffness because of the use of the gutter and a large external bead.

One thing that puzzled us was why the fender skirt when it was used, didn't cover the housing of the side-mounted spares. You'll find this oversight on at least two makes.

WHEELS—Serve more than ever to complete the decorative scheme. Budd's new chrome-plated, short-spoked wheel was much in evidence on every Studebaker at the show. This wheel has many novel features of design, chief of which is the fact that it is stamped from one piece, being drawn so that the outer ends of the spokes are also closed in.

Another interesting thing was the stamped corrugated disk wheel used by Willys and Oldsmobile. The corrugations simulate spokes, the finish is in color.

Metal tire covers have been universally adopted—some cover only the tread, others cover both tire and wheel. Some are in color or more chrome strips, others are chromium-plated over all.

Willys employs a Continental touch in housing the rear spare tire within the back panel so that the wheel is practically flush with the panel line. The next step might be a metal cover which would close in the wheel in much the same way as it is done on the Silver Arrow.

There seems to be a tendency to eliminate the prominent hub caps and blend this area into the wheel form. This is worked out in particularly effective fashion on the Cadillac V-16 and the Hupmobile sport models.

COWLS—Follow the style set by the De Soto last year, with a sloping line about parallel with the inclination of the windshield. Hoods come closer to the windshield except where cowl ventilators are used. Both Hupmobile and Willys feature an outstanding cowl construction recently developed by Heintz.

With the present emphasis upon long lines, particularly on cars of short wheel base, the joint between the hood and cowl has been closed up so as to eliminate all emphasis of the vertical line. For this reason every car (except Auburn) has eliminated the bright cowl band which was the rage a few years back. Naturally, this has resulted in shifting the position of parking lights from the cowl to the front fenders.

HARDWARE—And ornamentation are largely expressed in zinc die castings. There is a tendency for greater restraint and simplicty in radiator ornaments. Graham is an example of good design selected by Dreyfuss. LaSalle has an interesting radiator ornament ala moderne.

Door handles are simple rather than ornate and seem to recognize the utilitarian needs much more than usual. Thus the handles, in the main, are large enough to accommodate a man-sized mitt and are formed to fit the hand. Last year in the Oct. 1 issue of *Automotive Industries*, Henry Dreyfuss sketched a flush-type door handle set into a depression in the door panel. He was rather proud of the idea and thought it would look good on any modern car. How interesting it was to find that the designer of the Silver Arrow chose this kind of treatment for the car shown in New York.

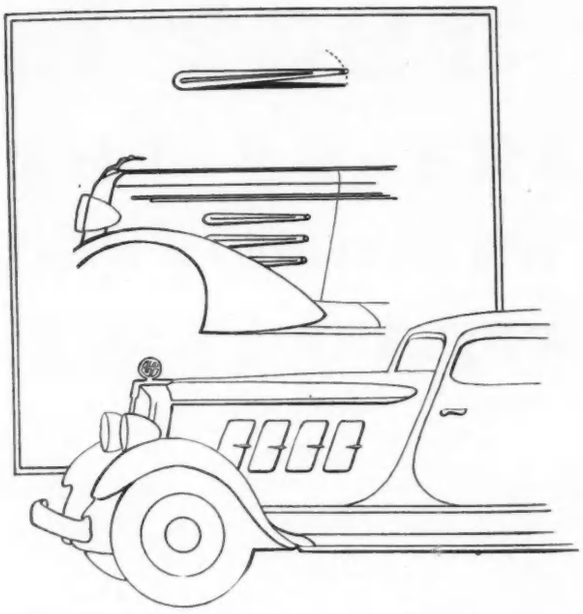
HOODS—Are changing with the time. They are longer and, in many cases, extend over the radiator shell. Designers have found a wide latitude for experiment in the louver arrangement and form. One of the most striking effects has been achieved on the Oldsmobile, which has three narrow streamlined louver doors hinged at the forward end. When opened, they create the impression of fleetness.

With only few exceptions the louvers are hinged doors instead of formed impressions, and there seem to be more colored doors than bright. Hupmobile doors look smart and rakish because of their parallelogram form inclined at the angle of the A-pillar. Willys aims for the same effect with inclined louver doors which are tapered to the angle formed by the hood and fender lines.

Cadillac and LaSalle set off the hood with rectangular doors set horizontally instead of vertically as is customary.

Both Studebaker and De Soto have a unique front end treatment gained by carrying the fender crown into the hood line instead of dropping an apron down to the sill. In this construction, the hood line is formed into a curve which follows the fender outline. We overheard several engineers debating on the effect

Practically all radiator ornaments as well as other hardware is of die-cast zinc as shown in the sketches of the LaSalle and Graham



A striking effect has been achieved on the Oldsmobile by the use of narrow streamlined louver doors as shown in the upper sketch. The Hupmobile doors are rakishly set at an angle and lend a smart appearance

of this design upon accessibility to the engine compartment.

LAMPS—Are appearing in color on several makes, the only departure from usual practice being the Willys, which mounts the headlamps in the fender apron instead of the fender crown ala Pierce-Arrow.

Since the cowl lamp mounting has disappeared, those, who provided parking lights, mount them on the front fenders. These lamp bodies are tastefully streamlined, the frame being of zinc in most cases.

Oldsmobile, in keeping with the present experimental mood, provides two torpedo-shaped tail lamps of rather large size.

RADIATORS—Follow the "snow plow" effect introduced on the light Packard last year. Most radiators have a V-front, exceptions being the De Soto with its distinctive curved front, and Packard and Cadillac which mount them vertically.

Some shells, notably on the Oldsmobile, Pontiac, Buick, Graham and several others are in color to match the hood and body.

IN GENERAL, no pains have been spared in molding sheet metal lines so as to produce suave, pleasing surfaces particularly at joints. The back panels of the Buick model 57, Oldsmobile, Graham and several others are oustanding examples of this refinement. Sheet metal now sheaths all running gear, gas tanks, and in many cases entirely encases and conceals the front end.

In working for smoothness of line, many models attain a pleasing continuity at the sides by sloping the front of the running board right into the fender curve. This is carried out in some fender skirts which continue the running board line well forward, aided further by a bright molding as in the case of the Graham.

Here again, some engineers especially those concerned with service are wondering how this sheathing of running mechanism will affect accessibility. In some cases, it looks as if it may be necessary to turn the car over in a trunnion fixture or run it over a pit in the service station.

In retrospect, one cannot fail to be impressed by the improvements in body and sheet metal technique evident at every turn. There is a strong feeling of change, mobility, and a general movement toward a new era of creative design. Consciously or unconsciously the movement seems to be pointing to some final streamline form which has been engaging the minds of the designers in the automobile world.

Colloidal Graphite Combines With Metal Surfaces

COLLOIDAL graphited oil, which is being manufactured by the Acheson Oildag Co. of Port Huron, Mich., and marketed under the trade name Oildag, is recommended as a suitable lubricant for running-in bearing surfaces, particularly on internal combustion engines. It is claimed that it establishes on the parts affected durable graphoid surfaces which reduce the running-in time to a minimum. These graphoid surfaces are said to have a marked affinity for oil, a property which counteracts the tendency of the oil film to rupture under heavy bearing loads. Being self-lubricating, graphoid surfaces possess the ability to provide efficient lubrication for relatively long periods in the event of total absence of oil.

On the effects of the Oildag on the bearing surfaces during the running-in process the Acheson company quotes E. Falz (Grundzuge der Schmiertechnik) as follows:

"Colloidal graphite, mixed in a certain proportion with oil is drawn into the microscopic pores of the shaft and bearing-metal, and under the influence of the pressure and rotation gives both members a high degree of polish never to be obtained merely by the ordinary means of practice. After a certain extended period of operation, all surfaces receive a dark, durable, glistening coat of graphite, which is not removable even by washing, because colloidal graphite (but not ordinary powdered graphite) enters into a very firm combination with a metallic surface.

"The advantages of this procedure are felt in various ways: Slowly rotating or merely oscillating pins with a high surface pressure, where fluid friction is not attainable, show a much lower friction when colloidal graphite is added to the oil than when it is absent. This is because the direct friction of steel upon graphite is decidedly less than friction between steel and bronze, or any other bearing metal.

"Another invaluable advantage of graphite lubrication from the operating standpoint is it peculiarity of maintaining operation for a long time after the oil supply has been cut off, and without allowing overheating or wear in the bearing. This fact, which has been confirmed by exhaustive experiments, is explained by the circumstance that the coefficient of friction of steel on colloidal graphite is not much greater than that of fluid friction, and a roughening of the graphite coated surface on a smooth shaft is not to be feared even when the pressure is very high."

1932 In

A SUMMARY OF THE

AS PUBLISHED

in AUTOMOTIVE

JANUARY 1932

What turned out to be a sectionalized forerunner of the Buick-Olds-Pontiac Sales Corp., the Southeastern Sales Co., was organized in Charlotte, N. C., at the turn of the new year.

The 32nd National Automobile Show, New York, opened to a record attendance.

Alfred Reeves, manager, N. A. C. C., announced that 1931 motor vehicle production in the U. S. reached 2,460,000 units of which 2,040,000 were cars. Total wholesale value of cars and trucks manufactured was $1,430,000,000.

Oakland (born 1907) passed away as the Pontiac name was carried on the V8.

James J. Walker (he was mayor then) held engineers spellbound as he deftly wove politics, investigations and praise of engineering together before the S. A. E.

Diesel engine interest began for the year with a 14,500-hour run by a Cummins engine at Indianapolis.

First rumblings of the 1932 automotive excise tax battle heard as Andrew Mellon (then Secretary of Treasury) recommended this step to Congress.

Alfred Reeves and Pyke Johnson were elected vice presidents of the N. A. C. C.

Earl H. McCarty elected president of Nash Motors, Charles W. Nash becoming chairman.

John W. Thomas became president of Firestone, Harvey S. Firestone assuming chairmanship.

Studebaker forms S.P.A.R. Sales Co. to merchandise parts of Studebaker, Pierce-Arrow and Rockne cars.

Motor magnates call at White House and attend hearing on excise tax in first skirmish of unsuccessful fight against excise tax.

E. A. "Eddie" Stinson killed in crack-up of Stinson airplane he was demonstrating.

Sir Dennistoun Burney, dirigible and car designer, guest speaker at annual S. A. E. meeting, Detroit, and Arthur J. Scaife (White Motor Co.) took charge of the society as president.

FEBRUARY 1932

General Motors reduced quarterly common dividend from 75c. to 50c.

Detroit-built Ford "midget" cars shipped to London by Ford Motor Co.

White Motor Co. bought into Indiana Motors Corp., later gaining control.

Charles L. Lawrence reelected president of Aeronautical Chamber of Commerce.

Average power of passenger car engines jumps 60 per cent from 1925 ratings, P. M. Heldt, *Automotive Industries*, finds.

Musselman wheel and low-pressure tires announced.

DeVaux-Hall receivers named; Continental later bought name and goodwill.

Henry Ford tells of plans to build a V8 (*See below*).

All U. S. lines dropped from General Motors British sales program.

Reo begins manufacturing in Canada at Dominion Motors plant, Leaside, Ont.

Nickel alloys and plating gained momentum during year, Robert C. Stanley reports, despite low tonnage in steel industry.

Motor vehicle registrations dropped from previous year's total for first time in history of industry (Statistical Issue, *Automotive Industries*).

Sir Malcolm Campbell roared to new race record at Daytona Beach, averaging 253.968 m.p.h., or 8.235 m.p.h. faster than his former time a year before.

MARCH 1932

McQuay-Norris began building a $500,000 plant near Toronto.

American Society of Tool Engineers organized with J. A. Siegel (Packard) as president.

Irving J. Reuter becomes operating head of Buick and Oldsmobile and chief aid to Richard H. Grant in working out the destinies of the Buick-Olds-Pontiac company.

APRIL 1932

General Motors put on a nation-wide "mid-season" automobile show in 55 cities, spending millions to stimulate car sales.

First complete mechanical description of the new Ford V8 was published in *Automotive Industries*, illustrated with staff photographs. (Issues of April 2, 9 and 16.)

New, larger Plymouth four announced; Chevrolet prices cut.

Lewis H. Kitteredge, 61, former Peerless president, died in Cleveland.

Henry M. Leland, 89, founder of Cadillac and Lincoln, died in Detroit.

Franklin announced its first 12 cylinder line.

All major car companies join in intensive advertising and sales drive.

John North Willys, Ambassador to Poland, returned to survey the business situation in Toledo, with view of

The News

NEWS OF THE INDUSTRY

DURING THE YEAR

INDUSTRIES

taking personal charge of his interests. Resigned (April 26) as Ambassador, assuming charge of Willys-Overland. Sailed for Warsaw to settle official business and take official leave.

Sam Miles, N. A. C. C. Show Manager, dies in Bristol, England.

MAY 1932

General Motors quarterly common dividend cut from 50c. (see February) to 25c.

100 m.p.h. set for qualifying run for Indianapolis annual 500-mi. run, superseding the 90 m.p.h. requirement.

Curtis Aeroplane signed contract to build craft in Anatolia, Turkey.

Congress legislated excise taxes of 4 per cent on cars, 3 per cent on trucks and 2 per cent on parts and accessories, after a long fight against the measure by motorists, farmers and automotive leaders.

Studebaker reorganizes sales administration of subsidiaries, with Paul G. Hoffman as president and Roy Faulkner and George M. Graham, vice presidents.

Estimated loss for Ford Motor Co. in 1931 was $53,586,000 after dividends.

JUNE 1932

"Stock" cars grab brilliant places in 10th annual Indianapolis classic, Fred Frame winning with the record-breaking average of 104.144 m.p.h.

Hugh Chalmers, 58, pioneer car builder, died in Beacon, N. Y.

Alvan Macauley reelected president of the N. A. C. C.

Engineers flay low-pressure tires, discuss problems of design at annual meeting.

JULY 1932

George K. Burgess, director Bureau of Standards, dies.

Sloan heads highway users organization to fight unjust tax levies.

New York area railroads announce store-door delivery, using trucks.

Hudson announces "Terraplane," formally named by Amelia Earhart.

Kaye Don sets new world's record of 119.81 m.p.h. for motor boats.

Fred Duesenberg, 66, dies of automobile injuries.

W. B. Mayo, veteran Ford engineer, retires.

AUGUST 1932

Automotive leaders hasten to Ottawa to keep in touch with Imperial Economic Conference.

Roy Dykeman Chapin appointed U. S. Secretary of Commerce.

Colin Campbell, 47, one time Willys-Overland vice-president, dies.

Splitdorf Co., founded in 1858, is sold to syndicate headed by Charles Edison, son of late inventor.

Ray A. Graham, 45, dies.

Assets of Kissel Motor Car Co., founded 1906, sold to Hartford, Wis., syndicate.

Jaeger Car Co. planning to manufacture a small, light automobile, incorporated in Belville, Mich.

Free trade is granted to Dominion by Great Britain in Ottawa agreement.

SEPTEMBER 1932

Gar Wood defeats Kaye Don at Detroit retaining Harmsworth trophy.

Indianapolis Race rules changed, factory interest increases.

Studebaker Corporation buys White Motor Co. (trucks).

Willys-Overland contracts to build International Harvester trucks.

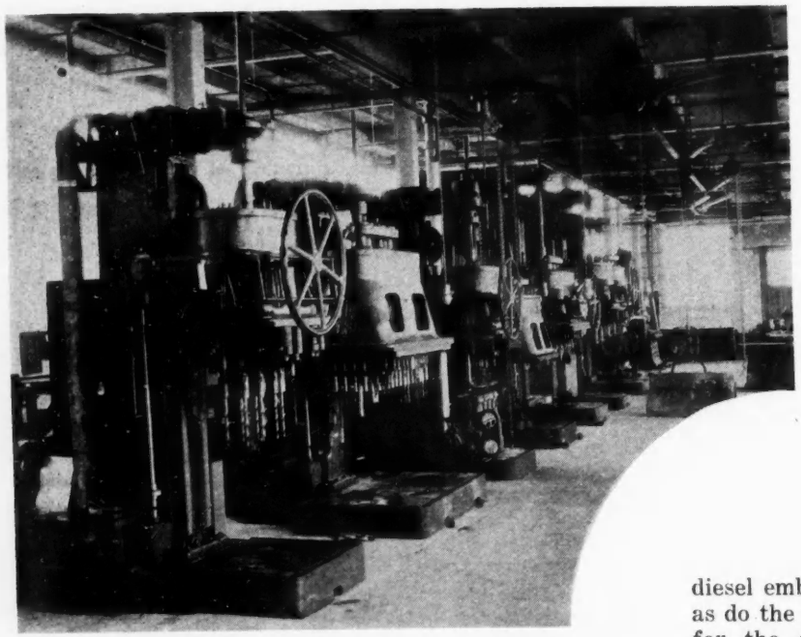
Gar Wood brings speedboat record back to United States with 124.91 m.p.h.

Continental Motors Corporation, for 30 years engine manufacturers, announce plans to build automobiles.

(Turn to page 112, please)

CUMMINS DIESEL Produced by A

Factory layout, selection of equipment, tooling and other details follow the best current practice. Manufacturing costs are comparable to those of gasoline engines of equivalent power and built in about the same quantities



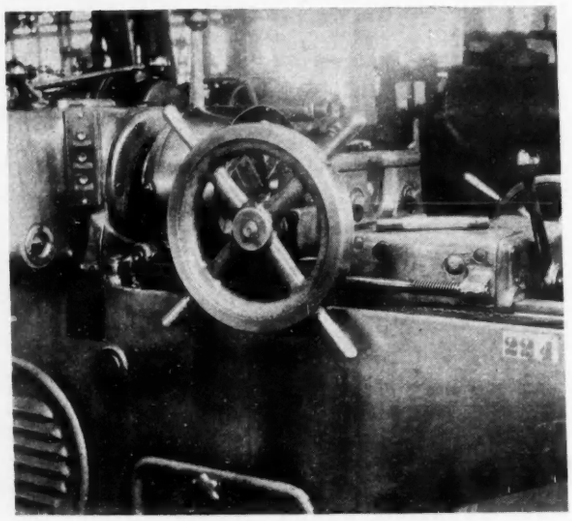


Fig. 1 (Top) Overhead Monorail conveyor system serving the machine shop.

Fig. 2. Lower) Studs requiring accurate alignment of threaded ends are produced on the Landmaco threading machine equipped with an automatic head.

WITH interest in diesel engines at a high pitch, many people are asking themselves and others, "How is it made?"—"How much will it cost?"—"How much does it differ from the way we build gasoline engines, and in what respect?"

We have pondered over these very questions. And to get some satisfactory answer, as an aftermath to the successful trip on the Cummins transcontinental bus run, described in Automotive Industries recently—we visited the new factory in Columbus, Ind., at Mr. Cummins' invitation. After making the rounds with their tool engineer, a graduate of automotive plants, we came away with some interesting observations.

First, the Cummins automotive diesel embodies the same general principles of design as do the current heavy duty gasoline engines, except for the combustion and fuel injection mechanism. Thus S.A.E. standards are incorporated wherever desirable as in the bell housing, mounting of electrical units, etc. Factory layout, selection of equipment, tooling, and other details follow the best current practice modified to suit moderate volume requirements.

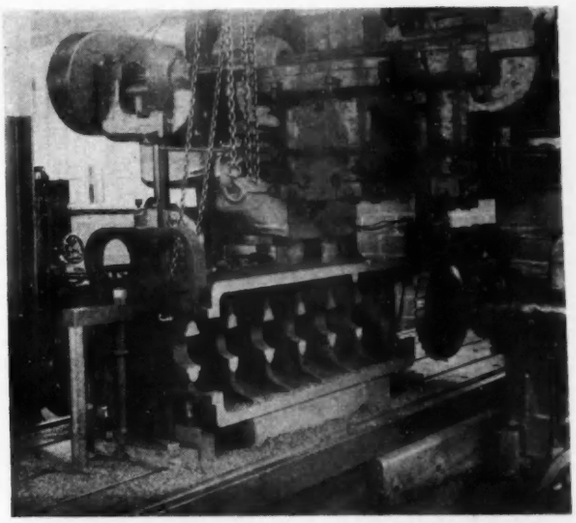
To be sure, the fuel distributing system, the very heart of this engine, is a special element that demands great care and precision in its manufacture. So much so that only several years back it was thought in automotive circles that only European manufacturers could build it. However, Cummins builds its own fuel distributor and injectors in a competent fashion. It is done by a group of skilled mechanics in a department equipped with precision machines which are regularly inspected for accuracy. Some of the newer machines are "certified" by their makers. All dimensions in this department are held "on the nose," as the tool engineer describes it, practically without variation from established decimal figures.

Whether the making of these precision parts may be mechanized and speeded up so as to materially reduce costs may be answered only when sales volume exceeds the probable demand of the near future and makes possible the development of special machinery.

Nevertheless, according to a recent comparison made by C. L. Cummins, the fact is that the Cummins engine

Automotive Methods

by Joseph Geschelin



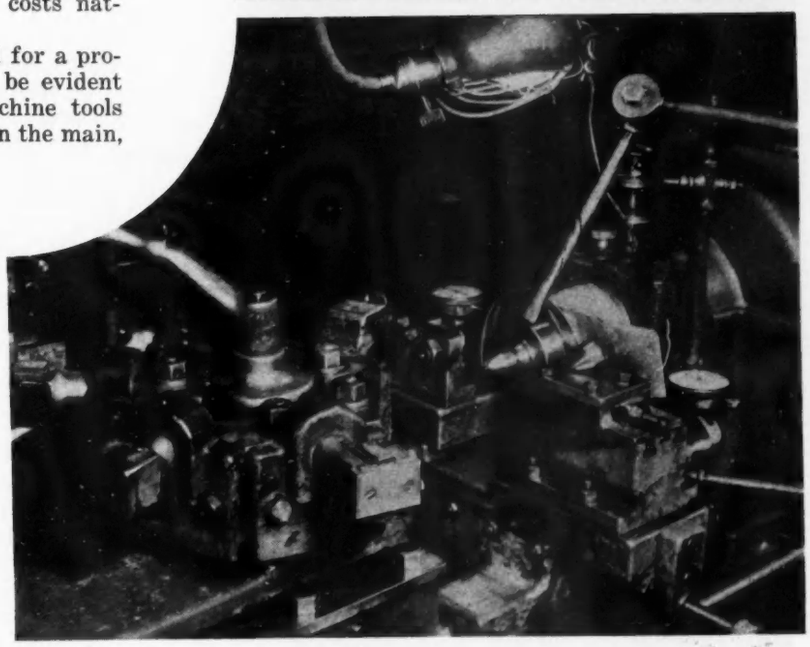


Fig. 3. (Lower) Forming the injector cap on a "certified" Warner & Swasey turret lathe. Turret tools used for roughing only. Finishing cuts taken by forming tools seen on sides of the cross-slide.
Fig. 4. (Top) Milling the top, bottom, and main bearing pads on an Ingersoll slab miller. This is the first machine shop operation.

is being produced at a cost comparable to the production costs of gasoline engines of equivalent power and built in about the same quantity. At present, the volume of heavy-duty engines is small as compared with that of lighter units and production costs naturally are greater in proportion.

The plant has been laid out and equipped for a production of 10 to 25 units a day. As will be evident from the factory views which follow, machine tools have been selected for this volume and are in the main, simple, rugged tools capable of great versatility and adaptability to design changes.

Sunlight and paint contribute much to the comfort of the workers. Window area in the roof and walls provides so much daylight that it is claimed that even on cloudy days it is unnecessary to use artificial lighting. Ground glass in windows effectively prevents glare. Overhead illumination provides 10 foot candle power at each station. Walls and ceiling are painted white with a green dado; machine tools are finished in a neutral color.

A very interesting arrangement of materials handling has been worked as shown partly in Fig. 1. It consists of geared chain hoists traveling along an overhead track which serves every operation and is designed to spot any casting within ⅛ in. of its position on any machine or jig. There is a stop every 20 feet on the monorail track which localizes the travelers in each zone, thus preventing traffic jams. Double and triple switches allow maximum flexibility. All chain blocks are of the high-speed safety type to prevent overloading.

As if to demonstrate the dependability of their own product, Cummins makes its own power from a single 500 hp. Cummins diesel which operates day in and day out at a cost of 0.6 cents per Kw. hr.

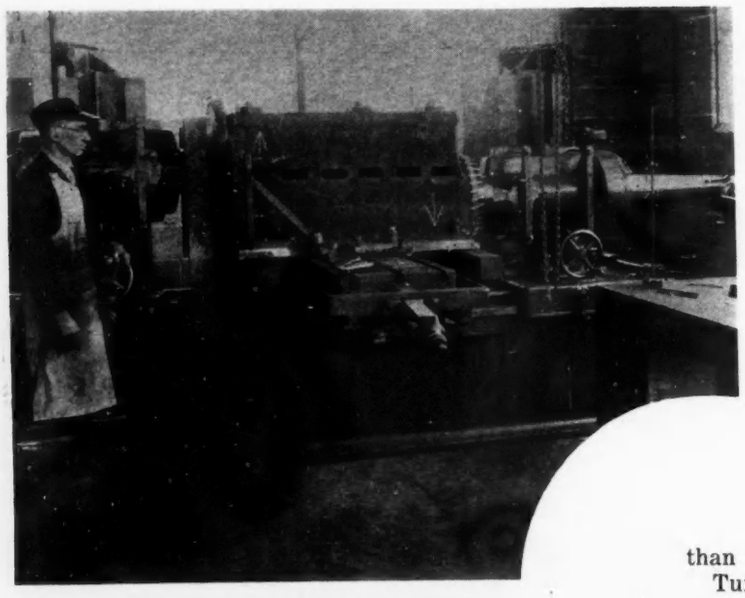
Before describing the routine operations along the cylinder block line, we have selected a few high spots from other departments to illustrate the manner of handling some of the production problems.

Consider an ordinarily simple part such as the cylinder head or main bearing stud. On the Cummins engine this is a vital part demanding a high order of precision and mechanical strength. Studs are made of heat treated stock and are fitted in the casting with 89 to 92 per cent thread. Both threaded ends are required to be in good alignment, not to exceed 0.002 in. runout for the entire length.

For this service they selected a Landmaco threading machine, fig. 2, fitted with an automatic head. This machine gets out the production to these exacting requirements with negligible rejections.

In another corner is a set up of more than passing interest, where a series of holes 0.005 in. in diameter are drilled in the tip of the injector cap which is being formed in fig. 3. It's much like a watchmaker's job. A simple setup is employed consisting of a small drill head driven at 10,000 rpm. by an electric motor. The drill is so fine that the operator views the work through a magnifying glass. Drills last about 350 holes on the average.

Great pains are taken in the manufacture of the fuel distributor which serves the same function as the ignition distributor on a gasoline engine. The gasket



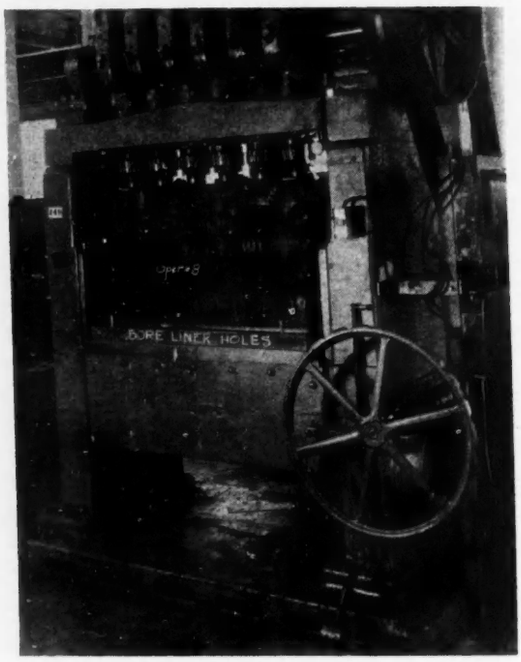


Fig. 5. (Top) Front and back ends face-milled on a Lucas, with limits of 0.002 in. in 24 in. for parallelism; 0.002 in. on the length (44¾ in). Fig. 6. (Lower) Moline Hole Hog in action boring cylinder holes to take the liners.

joints must be in perfect alignment and oil tight. The test for this specifies that the two halves of the distributor, bolted together without a gasket, must stand 25 lb. hydrostatic pressure without leakage. To accomplish this, both joint faces are lapped on a special cast iron plate until the surfaces are perfect.

The injector cup mentioned above is machined with great care and held to small tolerances. The inside surface is machined on a "certified" Warner & Swasey hand screw machine and then finished all over on the machine and then finished all over on the "certified" Warner & Swasey shown in fig. 3. Many serious difficulties attended the early efforts to put this operation on a paying basis. For instance, when starting from cold in the morning, after 20 minutes of running the frictional heat convected through the bed of the machine created sufficient variation in the length of work to cause great rejection.

The set-up in fig. 3 resulted from an intensive study which finally cut rejections to less than one in 960 pieces, about 1/10 of 1 per cent.

Tooling for this job turned out to be quite unorthodox. For example, because of the effect of temperature increase all dimensions are maintained from the cross slid by indicators mounted directly on the tool blocks. Work is screwed on the arbor against a positive stop and dimensions and angles closely held by watching the dial gages which read to tenths of a thousand. The angles at the tip are checked with a sine bar rather than a protractor.

Turret tools are for roughing only. The finishing cuts are made with the two forming tools on the cross slide; one corrects the large cone angle, the other finishes the tip. Curiously enough, both finishing tools are cocked slightly out of accurate alignment with the plane of the spindle in the present set up. While this may be difficult to explain theoretically, it happens to be the only arrangement that offered a happy solution to a very difficult production problem.

In the regular production of cylinder blocks, all castings are cleaned, water tested, and painted on the inside. The first machine shop operation is milling the top, bottom, and main bearing pads in one pass on the Ingersoll slab miller shown in fig. 4. Then two ⅝-in. hole are drilled and reamed in the bottom flange for registering all subsequent operations.

Front and back ends are face-milled on the Lucas shown in fig. 5, with overall limits of 0.002 in. in 24 in. for parallelism; plus or minus 0.002 in. on the length (44¾ in.) This is a good example of the accuracy that prevails throughout.

Next the camshaft side of the block is milled. Since the fuel timing depends upon the accuracy of alignment on this side, limits have been imposed of plus or minus 0.001 in. parallel in 42 in., and plus or minus 0.001 in. from the center of the camshaft to the side of the block.

Main bearings are bored in two separate operations on two different machines, the block being located from dowels and the finished pads. The seven main bearings are bored by means of a bar carrying individual, single point, cemented-tungsten-carbide cutters, spaced radially so that one tool is always cutting. The bar also is designed to prevent torsional twist, these features combining to produce a good cylindrical hole in accurate alignment.

The Cummins tool department is particularly proud of a boring mill set up in which are bored the gear centers for a train of six gears with a center distance tolerance of plus or minus 0.0005 in. Not bad for any machine shop, no matter what it makes! Due to the strains set up by the boring of six holes simultaneously, this job is designed to fly cut (rough and finish) one hole at a time.

Camshaft bores are machined in the same fashion except that a block cutter is used, boring seven bearings at once.

Since inserted cylinder liners are used, cylinder boring is the rather simple job of boring pilots at the

upper and lower ends as shown in fig 6; the machine is a Moline Hole Hog.

Drilling and tapping is handled by a battery of seven multiple-spindle Natco drillers shown in fig. 7, ranging from 24 to 60 spindles per operation. Cylinder blocks are passed from machine to machine by means of the overhead monorail conveyor described earlier. The longest drilling time on one of these machines is 5 minutes.

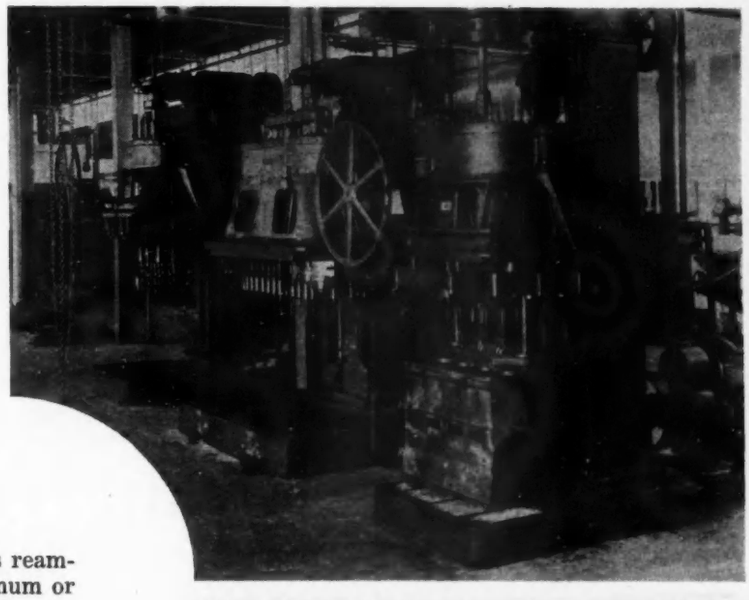
Radial drills are used for angular holes and for tapping the larger holes. Series taps are used for cylinder head and main bearing stud holes. The final tap in this group is a hand operation.

Cam and crank bearing bores are reamed by hand with special line reamers (design protected by Cummins Engine Co.) as shown in fig. 8. This design was developed after many unsuccessful attempts to use standard reamers. The Cummins reamers have a parallel expansion pilot and at minimum or maximum size do not vary in alignment. Blades are adjustable for size and have face angles that eliminate all chatter. The reamer described here line-reams seven bearings per block in nickel cast iron, producing 300 blocks on the average before it requires attention.

After machining, the case is washed in an oil solution which evaporates quickly when the case is drained, thus avoiding the corrosion due to the use of water or kerosene. The oil is constantly recirculated through substantial filters.

The case is then fitted with studs, sprayed, and routed to the main assembly. After assembly, every block is tested under its own power in an air-conditioned test room. At the end of the run, the pan is removed, the motor thoroughly cleaned, crated and shipped. Torque, speed, horsepower, fuel consumption, and idling and maximum speed acceleration readings are taken and must meet certain standards before the engine is acceptable.

Water is a scarce and expensive commodity in many parts of the Country. Thus at the Cummins plant, the water used in block testing engines is passed through a thermostatically controlled mixing tank and then piped to serve wash basins, toilets, showers. Not only does this conserve the water supply, but it provides warm water to the wash rooms without additional expense.



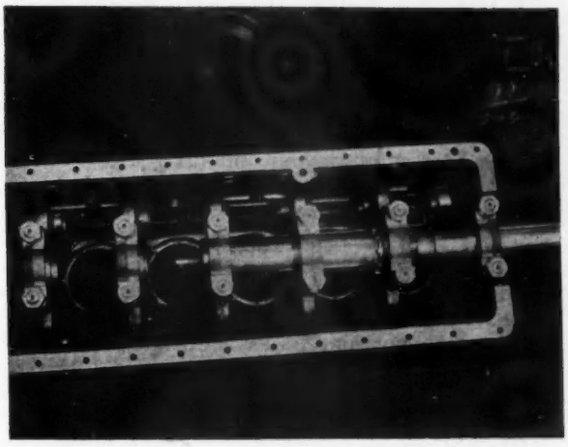


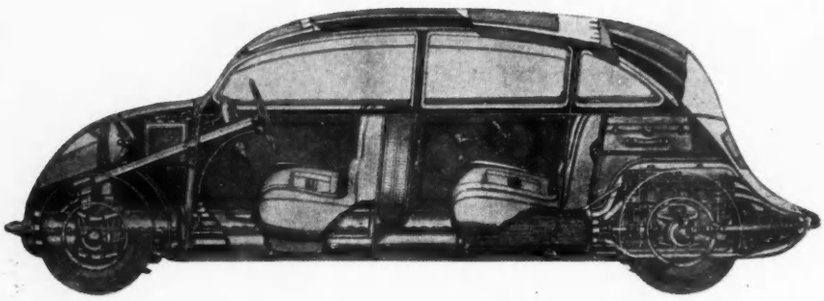
Fig. 7. (Top) Part of a battery of seven multiple-spindle Natco drillers installed in the cylinder block line.

Fig. 8. (Lower) Special line reamer developed by Cummins for hand finishing cam and crank bearing bores.

Stewart-Warner Power Brake Features

The operating linkage in the new Stewart-Warner "Full Power" brake system utilizes a self-aligning principle, and the construction is characterized by an absence of cross-shafts, bearing surfaces and other points where lost motion and friction might develop. Moreover, the layout of the linkage is such that it is not influenced by frame weave. It has an automatic release of the braking force on the front wheels, the action of which is proportioned to the angle of turning, this last feature is said to prevent loss of steering control and thus assures safety on turns.

The wheel-brakes are of the rigid two-shoe type—each pair of shoes is actuated by a cam mounted in a floating camshaft, so that the same pressure applies on the shoes of all wheels. The simplicity of the design is indicated by the fact that there are only 17 parts in the front wheel assembly and 14 at the rear. The rigid wheel-brake construction and the self-aligning linkages combine to give uniform braking and even wear. Because of this uniform action, adjustment is needed infrequently. When it is necessary, the only tools needed are a wrench and a screwdriver.



Design of a four-passenger car with tubular backbone frame, rear-mounted powerplant, and special aerodynamic body

Rear-Powered Ultra Modern Bodies

TWO ultra modern (or should we say futuristic?) designs due to an Italian body engineer, Count Mario Revelli di Beaumont, are reproduced herewith (from L'Auto d'Italia). Our Italian contemporary states that the Count is no newcomer in the body industry, that the most renowned body builders and some of the largest automobile manufacturers compete for his designs, which are always elegant, balanced, and original.

The first of the designs shown is of a four-passenger car of the aerodynamic type. It has a tubular backbone instead of the usual frame, the tube being of unusually large diameter and containing the radiator in its rear portion, underneath the rear seat. Air enters the large tube in front, passes through the radiator and fans the crankcase of the engine as it passes out at the rear.

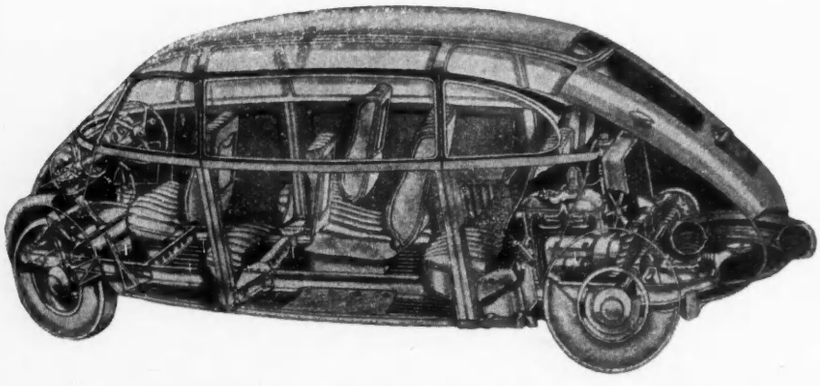
The six-cylinder vertical engine is mounted centrally between the two rear wheels and is rigidly secured to the end of the frame tube. The clutch and transmission are back of the rear axle. At the rear end of the transmission there is a differential gear, from the two side gears of which the power is transmitted to the two driving wheels by short propeller shafts extending diagonally to the wheel hubs, where the final drive gears are located. The drive, of course, is through bevel gears, the axes of which make an acute angle with each other.

All four wheels are independently sprung. At the rear the transverse semi-elliptic springs are anchored to the engine block, while in front the wheels are mounted on parallel rigid links and the frame is carried on transverse springs. It will be noticed that the fuel tank is placed between the engine and the rear seat, while the space above the engine is reserved for baggage. The spare tire is arranged back of the front seat and the storage battery in the front compartment forward of the dash.

The aerodynamic body also has a very unusual feature. In order to reduce the cross section (and, therefore, the wind resistance) to a minimum, the designer provides for a depression along the center of the roof, starting at the windshield and ending at the extreme rear of the body. There is said to be adequate head room to both sides of this "trough."

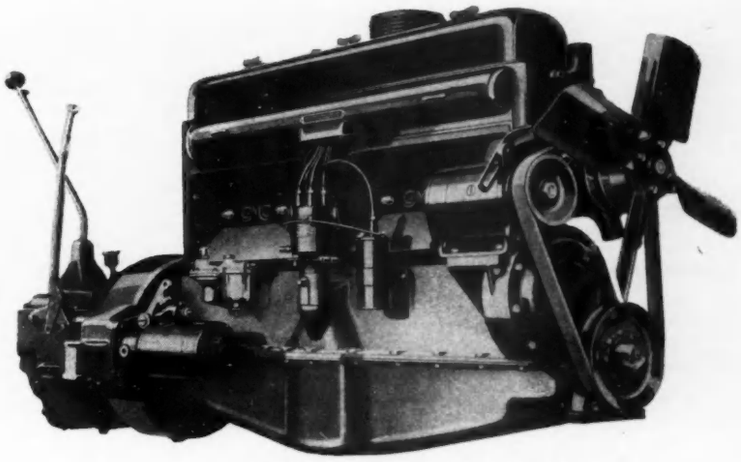
It seems somewhat doubtful whether the radiator provided will have enough capacity to carry off the waste heat, and the inaccessibility of the radiator is something that would not appeal to those having to do with the maintenance of cars.

The second design shown is of a six-passenger car with central drive. In fact, the whole seating arrangement is novel, there being an additional central seat back of the driver's seat and two seats on each side of the body. A feature of this design is that the spare tire is located horizontally at the extreme rear and serves also as a bumper. The seating is referred to by the designer as a herringbone arrangement.



Design of a six-passenger car with "herringbone" seating arrangement, central control, rear-mounted engine and rear-wheel drive

G. M. T.'s Have New Engines



Side view of the new series 221 G. M. T. six-cylinder valve-in-head engine

WITH the development of a new six-cylinder, valve-in-head engine and adoption of same for its T-18 (1½-2 ton) and T-28 (2-3 ton) models, General Motors Truck Co. is now in position to build all of its own engines.

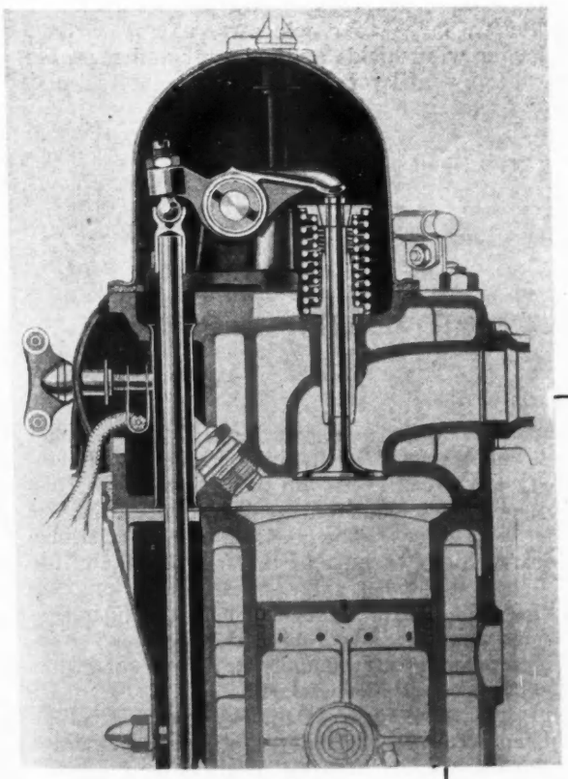
In general design the new engine—which has a bore of 3 3/16 in. and a stroke of 4⅝ in.—is similar to the next larger series of powerplants, the 257 and 300 series. It is claimed to develop more sustained torque per cu. in. displacement than other comparable truck powerplants. Its maximum torque is said to be 155 lb.-ft. at from 1000 to 1800 r.p.m., and the maximum output, 69 hp. at 2800 r.p.m.

Engine features, aside from the characteristic G.M.C. valve-in-head design, include semi-steel, lightweight pistons, chrome nickel-iron cylinder heads, downdraft carburetion, a center-outlet exhaust manifold, an oil-wetted type of air cleaner, crankshaft counterweight, harmonic balancer, steel-backed interchangeable main bearings removable without disturbing the crankshaft, roller-bearing water pump shaft mounting, crankcase ventilation, non-jamming starter drive, and three-point engine mounting on rubber.

This powerplant replaces the former 200 series, which was developed from the now discontinued Pontiac Six engine, was of the L-head type, had a three-bearing instead of a four-bearing crankshaft, and developed 23 lb.-ft. less torque.

The T-18 and T-23 models, which are now equipped with the new engine, have new chassis prices of $675 and $795 as compared with former prices of $595 and $745. Gross vehicle weight is 300 lb. higher for the T-18 and 500 lb. higher for the T-23.

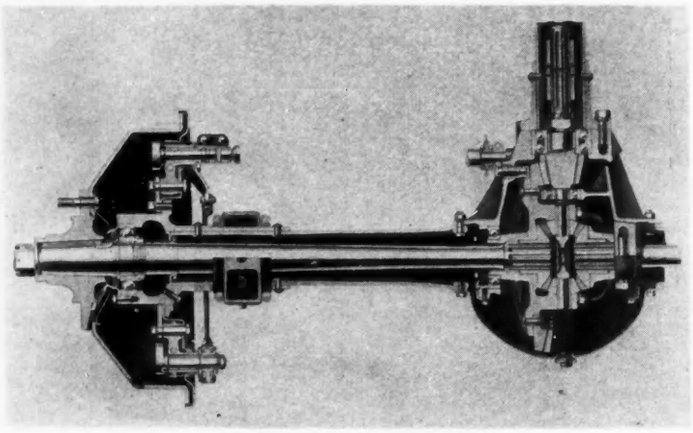
While these trucks are not designated as new models



Detail of the valve gear in the new engine

Comparison Between the New 221 Engine and the 200 Which it Replaces

	"221"	"200"
Displacement	221.4	200.3
Torque, lb.-ft.	155	132
Valve arrangement	In Head	L-Head
Crankshaft	4-Bearing	3-Bearing
Exhaust Manifold	Center outlet	Conventional
Carburetion	Down-draft	Up-draft
Weight	575 lb.	472 lb.



Section through the new rear axle on the T-18 showing the straddle mounted pinion and four-pinion differential

by the factory, there are a sufficient number of changes to actually warrant such a designation. On the T-18, for instance, in addition to the new engine, there is a new high-efficiency type radiator core developed by Harrison and used in a modified form on G.M. passenger car lines for 1933. The single-plate clutch is larger, with 92 sq. in. of frictional surface.

Transmissions remain unchanged, but propeller shafts are larger in diameter at the rear end and have a separate bolted flange, while splines are also larger and thicker. Universal joints are now of the spider type, with four cylindrical bearings.

Frame sections are heavier, and both the longer and the shorter chassis now have the same frame section, 7 1/16 in. deep. Front axles have been redesigned with a heavier center section, while rear axles are completely new. In the latter, there are now a straddle-mounted pinion and a larger pinion shaft; in place of the former two-pinion differential, there is a four-pinion type, which has greater torque capacity; ring gears are attached with a larger number of larger rivets, and a screw-type support is provided for the ring gear to absorb heavy shock loads, thereby preventing springing of the gear. Axle housings are also larger and have integral reinforcements. The brake drums on the front wheels have been increased in size. Wheels are of a new eight-spoke type. The dash carries instruments of the modern "airplane" type.

Many of these improvements are found also on the T-23 chassis, which has a larger radiator with the more efficient vertical ribbed cellular construction, a larger clutch, a heavier frame, a heavier front axle section, larger front wheel brakes, the new eight-spoke wheels, and the airplane-type instruments.

This chassis, which in the past has been built in two lengths of wheelbase only, 131 and 157 in., is now available also with a wheelbase of 166 in., which latter is particularly suitable for schoolbuses and the transportation of merchandise in bodies for which a minimum of rear overhang is desired.

Both the T-18 and T-23 now carry cabs of larger seat dimensions. Other cab features include a new type of visor, large rear windows, narrower front pillars, larger windshields and a larger and more efficient cowl-top ventilator replacing the side type of ventilator formerly used.

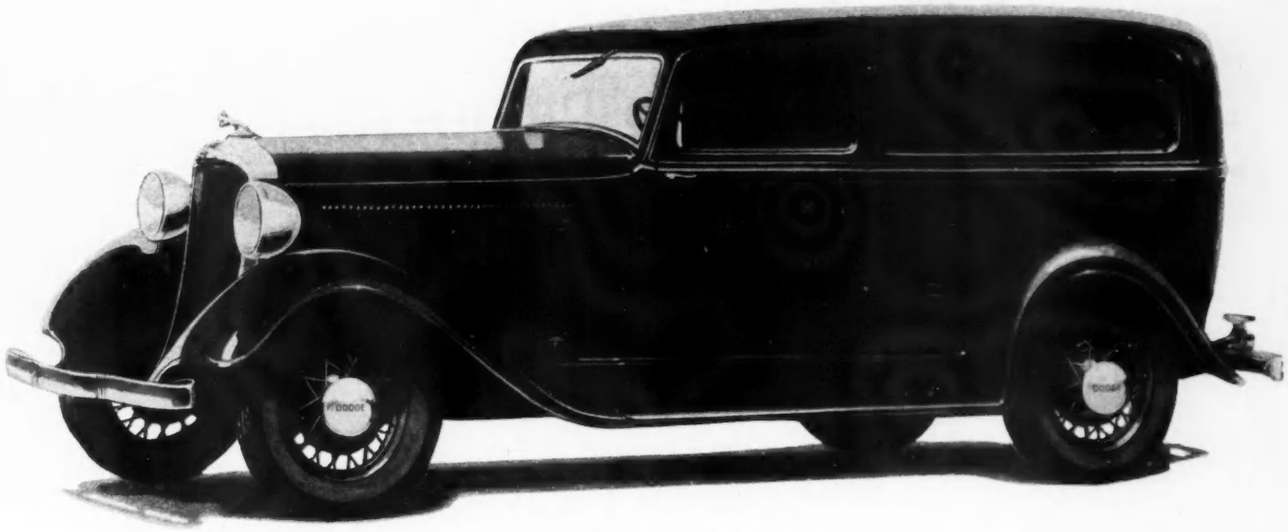
Lower Manifold Temperatures Lessen Gum Troubles

ACCORDING to tests conducted by S. P. Marley and W. A. Gruse of Melon Institute of Technology and reported by them in an article contributed by them to Industrial and Engineering Chemistry, the rate of gum deposition in intake manifolds of automotive engines can be reduced by nearly 50 per cent by keeping the manifold at what they describe as "winter running temperature," down to 80 deg. Fahr. Quoting from the paper:

"It seems that a moderate gum content can be tolerated in an engine if the temperature of the mixture in the manifold is kept low, but as soon as much heat is applied a fuel containing an appreciable amount of gum will begin to deposit the gum, and such deposits are heavier from a rich mixture than from a lean one. The carbon deposits in the combustion chamber are somewhat, but not much, greater with gum-bearing fuels at low intake temperatures, but the well-known tendency to lower carbon deposits with higher head temperatures could readily be invoked to remedy this.

"The use of low manifold temperatures calls for more volatile gasolines. The question of gum tolerance is significant chiefly because of the steady demand for fuels of better anti-knock value; these can be supplied by cracking, but the products are usually difficult to refine to permanently low gum-content values. Fortunately, anti-knock value usually improves somewhat as a gasoline is made more volatile.

"The present work suggests that by lowering intake manifold temperatures, volatile gasolines of moderate gum content might perhaps be used without serious trouble from gum deposits. Such a possibility should be considered in its relation to the application of high anti-knock cracked gasolines."



New Dodge Sedan Delivery Model

Dodge Commercial Bodies Follow Passenger Car Lines

THREE new commercial bodies are being offered on the new six-cylinder Dodge chassis, of which an illustrated description appeared in *Automotive Industries* of December 3 last. These are a sedan delivery, a commercial panel wagon, and a commercial express wagon. The sedan delivery is illustrated herewith.

The fronts of the cars are similar in appearance to the new Dodge passenger cars, comprising a sloping V-shaped radiator front, a chrome-plated radiator shell, fenders which conceal the chassis, chrome-plated windshield frames of the sloping type with rounded headers, and hoods which extend almost to the base of the windshield.

Cowls are single steel pressings and make possible the use of narrow yet rigid posts, which assure maximum vision for the driver. The dash is heavily ribbed and insulated against heat and noises. A cowl ventilator is located just back of the hood ledge. Door pillars are an integral part of the body sides, being flash-welded to the cowl and to the rear end of the side panels. The one-piece steel body sides are placed over hardwood posts, lined with insulating material and covered with plywood to make them sound-proof.

A full-size rear door gives easy access to the load compartment. It is fitted with a large, rectangular glass window. The roof is of the set-in type. Before lacquering, the entire body, including the cowl, is rustproofed by a process which also forms a bond for the primer coat.

On the inside the plywood floor is covered with rubber matting. Interior finish is in plywood veneered to a mahogany-grained appearance. For the illumination of the interior a dome light is provided, and this can be switched on and off by means of two switches, one on the light itself and the other at the rear of the left door. The driver's seat has a steel frame, Pullman-type springs, and heavy padding, and it is adjustable. A folding companion seat is hinged to the floor to the right of the driver's seat.

Tool Engineers Can Make Savings

WHAT a tool engineer can accomplish is best illustrated by a hypothetical example. Let us assume that his job is to tool up a valve for a six-cylinder engine for an annual production of 500,000 cars. Each engine has 12 valves, so that the total year's production would be 6,000,000 valves.

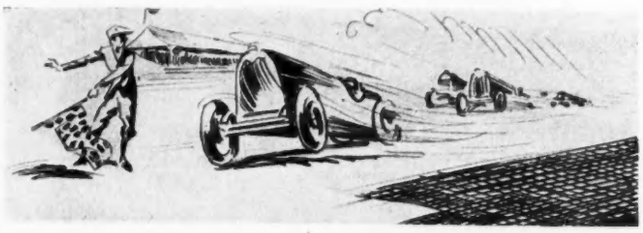
Assume that he saves one second on each of six operations on the valve. This slight saving in time on each valve is equivalent to the labor of four men for one year. It would seem that it is not asking too much of a tool engineer to save one second on an operation, if he is given time to make a close study of it.

As stated previously, there are around 4,000 details on an average six-cylinder car, and often as many as 15,000 parts. If we assume a low average of four operations to each part, 60,000 operations are required in the making of one car.

If the annual production is 500,000 cars, 30,000,000,000 operations are performed each year. If one second is saved on each operation, a total saving in labor of 3,412 men working one year is effected.

Without considering other savings in various items of overhead, this amounts to approximately a saving of $7,000,000 a year, or $14 per car.

(From a paper by O. B. Jones, president, Detroit College of Applied Science, read at the November meeting of the American Society of Tool Engineers.)



PRODUCTION LINES

A Few Notes on Some Racers

The author recently took a cross-country trip in a Cummins Diesel-powered bus. Here are a few notes in racing we thought would interest our readers.—Editor.

Automobile racing is somewhat outside of our routine experience but so was the rest of the trip we recently made to the Pacific Slope. Thus after seeing "Wild" Bill Cummings win the Ascot classic of 150 laps around a circular 5/8-mile track, we accepted quite eagerly an invitation to visit the homes of Miller and Riley specials.

Harry A. Miller has a fine little factory in Hollywood with plenty of room for additional equipment and manufacturing facilities. Right now he is working on a little matter of two special four-wheel drive roadsters for two New York sportsmen. One job will set the owner back $20,000; the other $20,500. Just toys for use in touring Europe.

One will be equipped with a moderate sized V-8, the other a V-16. Both engines are of the same displacement supercharged to yield 500 honest horse power and drive the little 132 in. wheel base roadsters at 140 m.p.h. when necessary. It is barely possible that these cars will do more than just go sightseeing on the other side of the pond.

Harry Miller likes the four-wheel drive and is turning over in his mind the possibility that some day in the not too distant future he may be building a sizeable quantity of them for those who want something different.

Riley Brett's headquarters are in the Cragar building, a millionaire's model machine shop with architecture befitting the surroundings. We don't think there is any harm in saying that he showed us the designs of a sweet racer powered by a new 8-cylinder engine expected to be very easy on lubricant. Perhaps easy enough to romp away under the Indianapolis restrictions in this respect.

This job will be completely streamlined with the cooperation of an aviation enthusiast.

With the Oakland track near San Francisco and Ascot at Los Angeles going continuously, Miller and Riley are the rallying points for many colorful figures of the track. There we had the pleasure of meeting the people whose names are news for racing enthusiasts. Some, no doubt, are already thinking and planning for the migration back East.

Both Riley and Miller have opinions on the new regulations that will govern racing at Indianapolis this year. Both foresee the necessity for more frequent pit stops for refueling and the consequent hazard to the participants. Although Harry Miller thinks that it will make the race more of a spectacle to the crowd and consequently not without merit from that point of view.

Naturally, the new rules will encourage the participation of factories in the Classic with stock or semi-stock entries. However, the race car builders already have met the challenge. In fact, their only regret is that the hard years of engineering represented by the present product are crowned with the necessity of penalizing the true race car with a lot of parasite weight which will have to be tacked on in places where it doesn't belong.

Of course a little of this weight will serve a useful purpose in the form of starting equipment. But the rest of it will just be added.

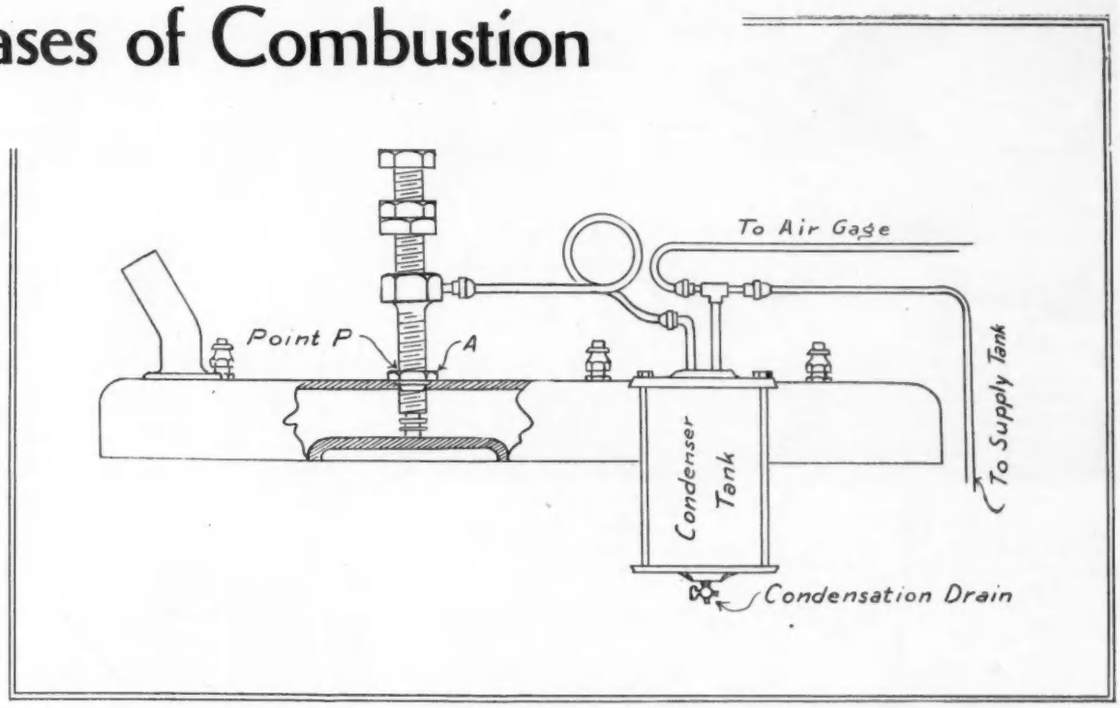
Riley was particularly strong about the fact that the rules may greatly hamper the development of small engines and superchargers. So as the matter stands it is a question whether a race is a sporting event only or something else. And the race car people have a feeling that there is some incongruity in a competition between totally different kinds of horses.

What with Miller planning something striking for the track and the new Riley special already past the preliminary design stages, there may be some surprises in store for those who make the pilgrimage to Indianapolis next year.

We also venture a guess that there may be a new Diesel-equipped special there which on paper at least has a lot on the ball. Suppose for instance that it makes 500 miles or more on the single minimum charge of fuel? And that seems to be no idle speculation. Suppose, too, that it won't require a stop for oil. Maybe the point score is going to be a big factor next year.—JOSEPH GESCHELIN.

MANUFACTURING MANAGEMENT METALLURGY

Brake Booster Operated by Gases of Combustion



Accumulator valve and condenser tank of the Otto Sander Brake Booster in their relative positions of installation

A BRAKE booster operated by gases of combustion from the engine is being marketed by the Otto Sander Co., Inc., Grand Rapids, Mich. The gases are collected through an accumulator valve screwed into the cylinder head and are first passed through a small condenser tank located adjacent to the cylinder block where it is kept warm by the heat of the engine, so that the condensate cannot freeze as long as the engine is in operation.

A valve is provided in the bottom of this tank for periodical draining. From the condenser tank the gases are led to a larger reserve tank which is mounted under the running board or behind the cab. This tank also has a drain valve, and a pressure gage mounted on the dash is connected to it.

The booster is installed as an addition to the regular mechanical brake hook-up. The control valve is mounted on the master brake rod a few inches behind the brake pedal. The usual clevis at the end of the brake rod is replaced by a special clevis between the valve and the stop nut on the end of the rod.

This is adapted to slide on the brake rod and permits of a slight motion of the brake pedal before the hub of the sliding clevis comes up against the stop nut on the brake rod. This motion of the brake pedal and rod opens the valve before the slack in the mechanical hook-up is taken up.

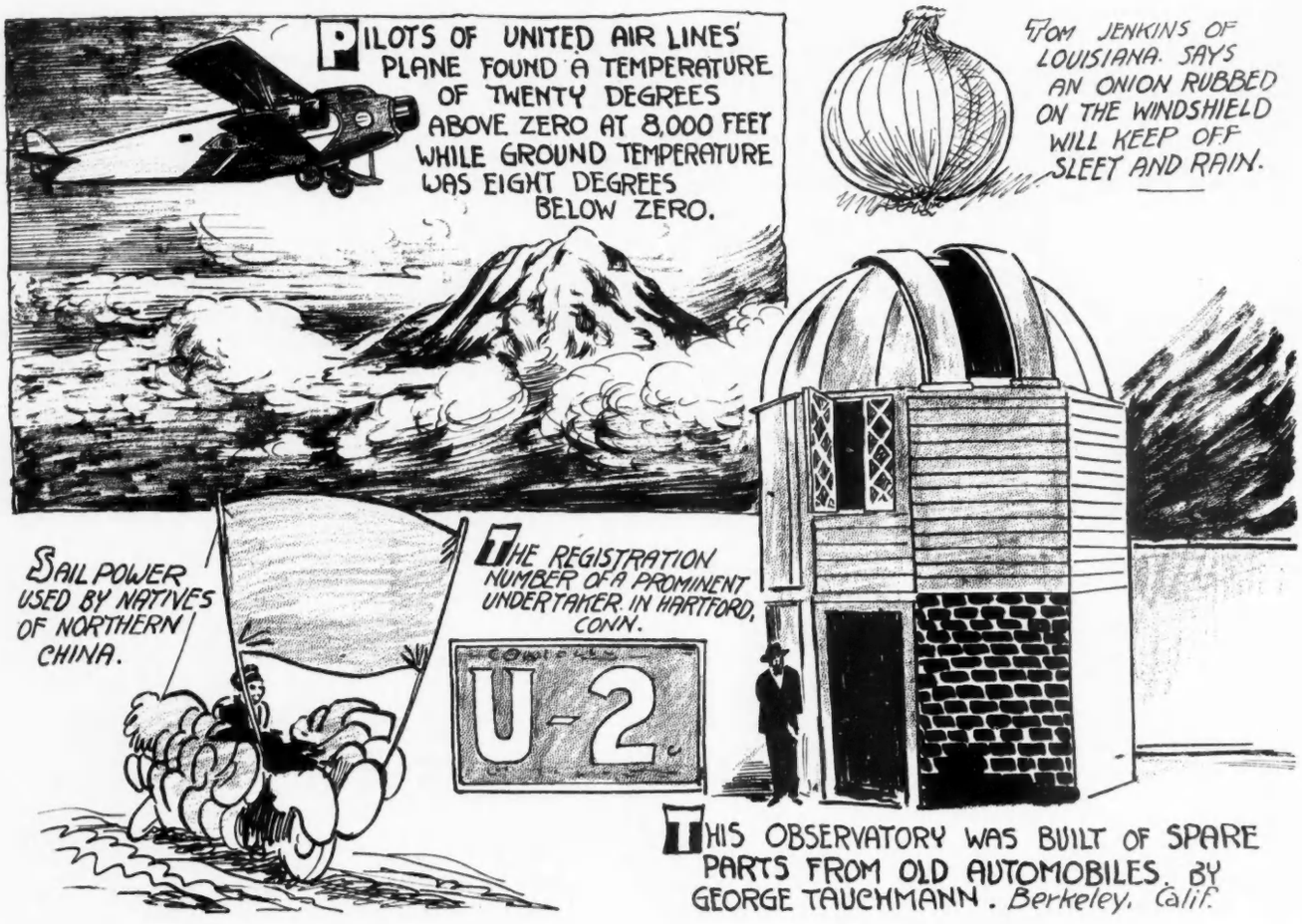
It will be seen that the sliding joint permits the brake pedal to move independently of the brake rigging when the booster functions. In the event of failure of the booster, the original mechanical hook-up is available for brake operation.

When the pedal is partly depressed, the control valve is opened, and gas under pressure flows into the power cylinder. This results in a pull on the brake linkage in proportion to the distance through which the brake pedal has been depressed. The cylinder then closes the valve and prevents the admission of further gas.

With trailer installations the same control valve operates the trailer brakes. Should the operator prefer his trailer brakes to take effect slightly in advance of those on the tractor, the advance action can be obtained by closer adjustment or shorter travel of the trailer brakes.

A LONG article on Safety Standards for Automobile Construction and Maintenance, by Halsey Maxwell, traffic engineer of the National Bureau of Casualty and Surety Underwriters, appears in the November issue of *Industrial Standardization*, published by the American Standards Association, New York. The author points out that in order that a car may be safe, the operator must have adequate visibility, steering and deceleration; he must be able to keep his wheels on the ground and must not be distracted by the operation of his car; he must be able to give visible signals, must receive plenty of fresh air, must be comfortable, must be protected against fire, and in accidents must be protected by the body from damage.

Automotive Oddities—By Pete Keenan


PILOTS OF UNITED AIR LINES' PLANE FOUND A TEMPERATURE OF TWENTY DEGREES ABOVE ZERO AT 8,000 FEET WHILE GROUND TEMPERATURE WAS EIGHT DEGREES BELOW ZERO.
TOM JENKINS OF LOUISIANA SAYS AN ONION RUBBED ON THE WINDSHIELD WILL KEEP OFF SLEET AND RAIN.
SAIL POWER USED BY NATIVES OF NORTHERN CHINA.
THE REGISTRATION NUMBER OF A PROMINENT UNDERTAKER IN HARTFORD, CONN.
U-2
THIS OBSERVATORY WAS BUILT OF SPARE PARTS FROM OLD AUTOMOBILES. BY GEORGE TAUCHMANN. Berkeley, Calif.

Write us if you know an Oddity

1932 in the News

(*Continued from page 101*)

OCTOBER 1932

Sloan heads war debt study committee.

Nomination of H. C. Dickinson as president of S. A. E. is announced.

Receivers reject R. E. Olds' bid of $105,000 for Durant plant.

Members of N. A. C. C. draw space for 1933 show.

Ford opens factory retail outlet in Buffalo, first of five established during year.

NOVEMBER 1932

White Motor Co. announces 12 cylinder horizontal opposed engine for buses.

Plymouth announces 70 hp. six.

Jordan Motor Car receivers and former executives reorganize company, buying plant and equipment.

W. H. Beal appointed president of Auburn.

Bus, powered with Cummins Diesel engine, made New York to Los Angeles run at 41.2 m.p.h. average running speed.

DECEMBER 1932

Henry Ford, seriously ill for several weeks, recovers.

Hudson builds automobiles in Canadian plant.

NEWS

Balance Capital and Consumables

President - Elect Dickinson Discusses Economics Before S. A. E. Annual Meeting

DETROIT, Jan. 25—Comparing the competitive economics systems of a nation to an engineering mechanism, H. C. Dickinson, president of the Society of Automotive Enginers, stated here Tuesday that inflations and depressions arise from a definite instability in the balance between capital goods and consumables. "This instability can be corrected without disturbing the present competitive system," Dr. Dickinson said. "Four major factors hampering the return of prosperity are: Lack of effective moves to reemploy men due to conservative attitude of banks, consistent propaganda for further reduction in personnel, proposals aimed at further extension of selective taxes and strong tendency for further new capital investment through increased debt."

Dr. Dickinson spoke on the second day of the annual meting of the Society, which opened Jan. 23 and closed Jan. 26.

Presentation of the Wright medal for the best paper on aircraft during the past year to E. P. Warner, editor, Aviation, and of the Manly memorial medal for Ford L. Prescott of Wright Field for the best paper on aircraft engines was made at the aircraft session at which Clarence M. Young, assistant secretary of Commerce discussed air transportation systems.

An address by T. R. Dahl, White Motor Company, Monday morning on Motor Vehicle Legislation brought out suggestions of preparation of railroad legislation for trading purposes at sessions of the state legislatures.

Monday night's student session was featured by two speakers: B. E. Hutchinson, Chrysler Corp. and Dr. H. C. Rentschler, Westinghouse Lamp Co. Mr. Hutchinson discussed the automobile's place in American transportation. "Sixty Octaves of Radiant Energy" was Dr. Rentschler's topic profusely illustrated with demonstrations.

New Ford Pre-Showings Expected About Feb. 1

PHILADELPHIA, Jan. 25.—Preshowings of new Ford models are reported to be scheduled for next week. These showings are expected to include, at least, the larger of the two eight-cylinder models which it is understood will be in the Ford 1933 line.

Persistent rumors that Ford would make an announcement at the end of this week could not be confirmed up to the time of going to press.

Increased activity on the part of Ford suppliers and at the Rouge plant, and the clearing out of the showroom at the Highland Park plant, are evidences of an early introduction.

Auburn Reports 1932 Net Loss of $974,751

Current Ratio is 33 to 1 with Cash, etc. $5,137,676

CHICAGO, Jan. 22—A net loss of $974,751 after depreciation, interest, taxes and minority interest, is reported by the Auburn Automobile Co. and subsidiaries for the year ending Nov. 30, 1932. This compares with a net profit of $3,579,849 in the preceding fiscal year.

Current assets on Nov. 30 totaled $10,898,194 including $5,137,676 cash and U. S. government securities against current liabilities of $330,228.

Rail-Motor Group Splits on Rates

NEW YORK, Jan. 24—A report from the Joint Committee of Railways and Highway Users is expected to be filed this week with the National Transportation Committee. The committee's secretary, Dr. W. J. Cunningham of Harvard, states that the rail and highway interests on the committee had agreed on a program of regulation of commercial vehicles with two exceptions. The exceptions have to do with regulation of motor carrier rates and the limitation of lengths of vehicles.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

NEW YORK, Jan. 25—Although small gains were reported here and there, general trade last week remained quiet. There was a moderate improvement in New York both in sale of goods and collections. The heavy industries were generally quiet.

Railway freight loadings during the week ended Jan. 14 totaled 506,322 cors, which marks an increase of 70,670 cars above those during the preceding week, but a decrease of 66,327 cars below those a year ago and a decrease of 218,890 cars below those two years ago.

FOREIGN TRADE POOR

Foreign trade of the United States during December again made a poor showing. Exports totaled $136,000,000, as against $139,382,000 during the preceding month and $184,070,000 a year ago. Imports amounted to $97,000,000, as against $104,466,000 in the preceding month and $153,773,000 a year ago. Total exports for 1932 amounted to $1,617,877,000, as against $2,424,289,000 for 1931, while imports totaled $1,322,665,000, as against $2,090,635,000.

CONSTRUCTION QUIET

Construction contracts awarded in 37 eastern States during December, according to the F. W. Dodge Corporation, amounted to $81,219,300, as against $136,851,600 a year ago. Contracts awarded during 1932 totaled $1,351,158,700, as against $3,092,849,500 during 1931.

COTTON CONSUMPTION GAINS

Cotton consumed in the United States during December amounted to 484,337 bales, including linters, as against 556,047 bales during November and 461,312 bales a year ago.

CRUDE OIL OUTPUT

Average daily crude oil production for the week ended Jan. 14 amounted to 2,011,050 barrels, as against 1,777,450 barrels for the preceding week and 2,193,450 barrels a year ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices during the week ended Jan. 21 stood at 56.4, as against 57.3 the week before and 57.4 two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City during the week ended Jan. 18 were 19 per cent below those a year ago.

STOCK MARKET DULL

The stock market last week was very dull, with few buying orders. The tendency was downward, although unsustained rallies occurred toward the end of the week. The level of trading did not reach a million shares on any day. Prices for the week were irregularly changed, but mostly lower. Following the recent sharp advances, general declines were the rule on the bond market.

FEDERAL RESERVE

The consolidated statement of the Federal Reserve banks for the week ended Jan. 18 showed practically no change in holdings of discounted bills and bills bought in the open market. Holdings of Government securities declnied $34,000,000. The reserve ratio on Jan. 18 was 64.7 per cent, as against 64.1 per cent a week earlier and 63.0 per cent two weeks earlier.

Committee Calls Double Taxation Crime But Congress Likely to Retain Gas Tax

Report Says Adverse Effect of Dual Levies Clearly Shown by Drooping Sales of Tobacco and Gasoline

WASHINGTON, Jan. 23—The automotive industry will not see the present session of Congress enact any legislation that will he helpful to it. On the other hand, it will not see any adverse legislation, except for the prospect for retention of the cent-a-gallon tax on gasoline. That promises to be the only tax legislation prior to the special session under the Roosevelt regime. Continuance of the gas tax was recommended by President Hoover. Its retention appears to be in strong favor. Not that it is a fair tax but it is one of those taxes easily applied. It nets badly needed coin. The goose stands lots of plucking before squawking. Such is the theory and practice of legislation.

It is a tax that goes to make up the system of so-called double taxation, which a committee of Congress in a report just issued, has called a crime. Beyond calling it that though it has done nothing about it. It may at some future date, certainly not at the present do-nothing session of Congress with its ballyhoo, spouting and political shystering.

The committee on Double Taxation, made up of members of the House Committee on Ways and Means, is headed by Representative Vinson of Kentucky, and has prepared an excellent report. No group of business men could prepare a better and more intelligent analysis of intrusion by the Federal government and the state governments upon each other's fields of taxation. Nor could a group of business men, those suffering from such taxation, condemn the practice more sharply than does the Committee on Double Taxation. The difficulty is to get Congress to follow the sound principles laid down.

"We stated that both the states and Federal government were guilty of this crime—double taxation," the preliminary report of the committee says. "Until the tax bill of 1932, the gasoline field had been solely used by the states. It had been and is the source of tremendous revenue for them—more than $500,000,000 per annum. In the last tax bill, however, the Federal government laid its taxing power on gasoline to the tune of 1c. per gal. Now, every state in the Union has both federal and state tax on gasoline. The state rates from 2c. to 7c. per gal. In many instances, counties and cities also impose gasoline taxes for their local use. Therefore, in many instances, we see four distinct gasoline taxes—federal, state, county and city.

"In Harrison County, Mississippi, the total tax rate on gasoline is 10c. per gal.—1c. Federal, 6c. state, 3c. county. The county tax is used in the retirement of bonds for the construction of sea walls. Assuming the use of 50 gal. of gasoline per month, the tax burden on gasoline for the year in Harrison County, Mississippi, is $60."

The report says there are 326 duplications of taxes between the Federal government, states and territories. Undoubtedly, it is pointed out, the heavy tax burden upon various commodities means diminution of sales, with the consequent lesser yield in revenue.

"This aspect is clearly discernible in such generally used commodities as gasoline and tobacco," the report points out.

Willys Aims at 125,000 Fours

BUFFALO, Jan. 23—That 125,000 of his new four-cylinder cars would be on the road by the end of this year was the hope expressed by John N. Willys, at a meeting of his dealers in this area. Production, Mr. Willys said, was being stepped up from 300 to 400 cars daily, while factory employment has been increased from 2000 to 8000.

General Tire Nets $202,354

AKRON, Jan. 24—General Tire and Rubber Co. reports a net profit of $202,354 after all charges, including depreciation and inventory adjustments, for the year ending Nov. 30, 1932, as compared with a deficit of $444,063 in 1931. Current assets total $6,170,437, including cash of $659,021, against current liabilities of $859,755.

New Reo Bus Head

Harry A. Fitzjohn, organizer and former head of the Fitzjohn Mfg. Co., Muskegon, Mich., has been named head of the newly formed bus division of the Reo Motor Car Co., Lansing.

Hannum Becomes Lavine Gear Co.

MILWAUKEE, Jan. 23—Corporate title of the Hannum Mfg. Co., 634 East Keefe Avenue, manufacturer of steering gears, brake link and other automotive specialties, has been changed to Lavine Gear Co., the original name of the concern. About 10 years ago George H. Hannum, widely known Detroit automobile industrialist, purchased the company and changed the title to Hannum Mfg. Co. The concern reverted to the Uihlein interests several years ago. Mr. Uihlein is president and Arthur H. Groth secretary.

Grossman Heads C.A.C.C. Again

TORONTO, Jan. 25—At a meeting of the Canadian Automobile Chamber of Commerce held here during the National Motor Show, D. R. Grossman was elected president for the third consecutive term. Grossman is vice-president and general manager of the Studebaker Corp. of Canada, Ltd.

Decision on Chrome Plating

The United States Supreme Court yesterday denied a petition of the International Silver Co. for a review of lower court decisions in a suit brought by United Chromium, Inc. The lower courts held that a patent of the latter for chromium plating is valid. The patent is based upon the plating technique developed by Colin J. Fink of Columbia University.

Plymouth Increases Wheelbase to 108 In.

DETROIT, Jan. 23—In order to permit the installation of fenders with tire wells, the wheelbase of the Plymouth Six has been increased 1 in. to 108 in. The original design did not provide for this type of equipment but in order to comply with demands from the field, it was decided to make fender wells available.

McAneeny and Hastings New D.A.C. Directors

DETROIT, Jan. 21 — Charles D. Hastings, David H. Crowley, Hugh Ferry and Charles T. Bush were elected and William J. McAneeny and J. B. Webber were reelected to the directorate of the Detroit Athletic Club at the club's annual meeting. All will serve three-year terms.

Johnsen Ring Formed

WAUSAU, WIS., Jan. 24 — The Johnsen Piston Ring Co. has been incorporated here with an authorized capital stock of $25,000 to engage in the manufacture of piston rings and other gasoline engine specialties. The principals are S. E. Johnsen, Erving Walker and E. F. Johnsen.

Seven States May Cut License Fees

Passage of Bills Lowering License Costs Should Help to Keep Cars on the Road

WASHINGTON, D. C., Jan. 23—In seven states — Arkansas, Georgia, Kansas, Massachusetts, Minnesota, Nebraska and Tennessee—bills have been introduced in the state legislatures providing for a reduction in registration fees, the National Highway Users Conference reports.

Following are the proposals to reduce registration fees: In Arkansas there are three proposals: first, a reduction of 50 per cent in horsepower and weight tax for passenger cars, and a further reduction of 50 per cent in the case of cars which have been in use for three years or more; second, a reduction of two-thirds for passenger car fees, and third, a flat fee of $1 for each car which has been used for more than three years. In Georgia, a 50 per cent reduction in the registration fees for passenger cars. In Kansas, a reduction of approximately one-third in the registration fees for passenger cars and private trucks. In Massachusetts, a reduction in the registration fees of traders from 50c. to 15c. per cwt. net weight. In Minnesota, two proposals—one for the reduction of registration fees for farm trucks of 50 per cent of the base value and one of 50 per cent reduction in the registration fees for passenger cars and trucks and tractors of less than two tons net weight. In this state it is proposed, however, to increase the fees on buses. In Nebraska, a proposal to reduce the fee from $8 to $5 for vehicles having a shipping weight of less than 2,700 lbs. and from $12 to $6 for those of 2,700 lbs. and over. Another proposal in this state is the reduction of the fee for a vehicle having a shipping weight of less than 2,700 lbs. from $8 to $5.

Paul Bablot

Jan. 1—Paul Bablot, pioneer race driver and automobile dealer, died at Marseilles, Dec. 28, from cancer on the stomach. In 1903 Bablot became a Berliet dealer at Marseilles and succeeded in building up one of the biggest businesses in the south of France. Always prominent in races and competitions, he drove for Berliet, Brasier and Delage with considerable success. In 1921 he was a member of the Ballot team which raced at Indianapolis.

Factories in Art Show

DETROIT, Jan. 23—A 10-day exhibition of "Art in the Automobile Industry" is in progress here at the Society of Arts and Crafts. Companies participating in it include Chrysler, Ford, Hudson, Lincoln and Packard.

Federal Reserve Business Indexes

(1923-1925=100)

	Industrial Production	Automobile Production	Automotive Employment	Automotive Payrolls
Dec., 1932	66*	60*	52	32
Nov., 1932	65	31	46	28
Dec., 1931	74	66	69	48

*Preliminary.

All indexes except payrolls adjusted for seasonal.

Willys in Canada Names Mackinnon

TORONTO, ONT., Jan. 23—T. A. Russell, president of Willys-Overland, Limited, has announced the appointment of Ross Mackinnon as general sales manager of the company. Mr. Mackinnon was formerly on the staff of the Massey-Harris Company, and succeeds Florian Leduc, former general sales manager, who retired owing to ill-health. Mr. Mackinnon is well known among automobile men, inasmuch as he was for 12 years associated with General Motors of Canada, first as general sales manager of Chevrolet division, and finally as assistant general sales manager of that company.

Neil McMillan

DETROIT, Jan. 21—Neil McMillan, 80 years old, secretary of Detroit Metal Specialty Co., died yesterday of heart disease in the Jefferson Clinic and Diagnostic Hospital here. Prior to his affiliation with Detroit Metal Specialty Co. he was connected with Detroit Sheet Metal Works, president of the Art Stove Co. and general manager of National Can Co., which he organized in 1901.

Cleveland Castings Merged

CLEVELAND, Jan. 23—The Cleveland Castings Pattern Co. has been absorbed by the Wood & Spencer Co. Both companies are located here and are owned by the same interests. Wood & Spencer will continue the manufacture of wood and metal pattern equipment.

Bullard Licenses G.M.

The Bullard Co. of Bridgeport, Conn., has granted the General Motors Corp. a license to use the Bullard-Dunn process for electrolytically descaling metal. This license covers the use of the process in all General Motors' plants and was executed after tests in the Cadillac plant. and by General Motors Research.

New Ruling Clears Excise Tax Tangle

Bureau Ukase Covers Taxes on Instalment Sales Made Between May 1 and June 21

Excise taxes are due on instalment payments after June 21 on all sales between May 1 and June 21, 1932, regardless of the date of delivery if the title did not pass until after June 21, according to a ruling just handed down by the Treasury Department.

Only instalment sales made prior to June 21 where title passed, and instalment sales made prior to May 1, 1932 regardless of when title passed, are free from application of the tax after June 21, 1932.

The Internal Revenue Bureau's ruling, contained in a letter to John E. Walker representing the N.A.C.C., follows:

"The Bureau now holds that where a sale of a taxable article on the instalment plan was made by the manufacturer prior to June 21, 1932, and title to the article sold passed from the manufacturer prior to that date, no tax is due on the instalment payments made on or after such date.

"Where a contract for the sale on an instalment basis of a taxable article by the manufacturer was made on or after May 1, 1932, title passing from the manufacturer on or after June 21, 1932, instalments paid on or after that date are taxable, regardless of the date of delivery.

"Where a contract for the sale on an instalment basis of a taxable article was made by the manufacturer prior to May 1, 1932, and the article was delivered to the consumer prior to June 21, 1932, although title to the article does not pass from the manufacturer until on or after June 21, 1932, instalment payments made on or after such date are not taxable. In such a situation, if the delivery made prior to June 21, 1932, was to any person other than a consumer, instalments paid on or after June 21, 1932, are taxable.

"Where a lease contract, or a conditional sales contract purporting to be a lease, was made by the manufacturer prior to June 21, 1932, but not prior to May 1, 1932, title passing and delivery of the article being made on or after June 21, 1932, payments made after the effective date of the law are taxable. Where such a contract was made prior to May 1, 1932, and the article was delivered other than to a consumer prior to June 21, 1932, the tax will attach to rentals or instalments paid on or after June 21, 1932."

Webster Credit Manager

AKRON, OHIO, Jan. 17—G. L. W. Webster has been appointed Goodyear credit manager to succeed the late H. B. Hamlin.

Chester I. Campbell

BOSTON, Jan. 21 — Chester I. Campbell, dean of American automobile show managers, died Jan. 20 at Belmont, Mass., when he suffered a heart attack while making an address before a fraternal order. He was 63.

First managing the Boston automobile show in 1905, he had a longer experience in directing expositions than any other man in the automobile business except the late Sam Miles. Since 1905 Mr. Campbell had managed every Boston show.

Chester I. Campbell

Mr. Campbell was unusually active in civic affairs in his home town of Quincy and in 1914 served as mayor of that city. From 1926 to 1932 he was a member of the Governor's Council. Last fall he was a candidate for Lieutenant-Governor in the Republican primaries.

At the time of his death he was secretary of the Boston Automobile Dealers' Association, a post he had held continuously since 1902, and was president of the Campbell Motor Parts Corp. in Boston.

Mr. Campbell's activities extended to many expositions other than automobile. He directed the annual expositions of progress, sportsmen's shows and others. During the war he was in charge of all government exhibitions held throughout the country.

January Production Holds Close to 1932

Early Reports Indicate Retail Sales Getting Off to a Slow Start

PHILADELPHIA, Jan. 25—January production of cars and trucks is expected to run between 110,000 and 120,000, against about 115,000 in December and 123,075 in January, 1932. Much of this production has gone to stock dealers with the new models introduced at the New York Show. Consequently, until really accurate figures on retail sales are available, whether the industry will be able to maintain or increase its present pace, cannot be estimated. Reports on January retail business from scattered points, however, are not particularly reassuring.

With reports on December passenger car sales available for 40 states, there is now no doubt that domestic volume ran within a few thousand one way or the other of 1,100,000 units, against 1,920,000 in 1932.

The partial December returns on passenger car sales put Ford in first place with an estimated national total of 12,300. Plymouth takes second place with about 11,200, and Chevrolet third with 8700.

Republic Steel Expanding

YOUNGSTOWN, Jan. 22—Operations of the Republic Steel Co. are at 19 per cent, the highest level since last July. New business is reported as being booked at a rate 30 per cent higher than at the low point last August.

Prices on Steel Are Uncertain

Steel Wire Prices Stationary With Better Demand Indicated —Pig Iron Sales on Uptrend

NEW YORK, Jan. 26—Uncertainty over the price outlook in the steel market became more pronounced this week. Following the marking down of wire and wire products by from $2 to $6 a ton, a rather soft undertone developed in other descriptions of steel. Sheets yielded further ground, cold rolled 20 gage being now generally quoted at 2.30c, Pittsburgh. The strip steel market is not entirely unaffected, although sales managers characterize hot-rolled strip quotations as firm.

In cold-rolled there is, however, more or less irregularity. There is much concern on the part of sellers over the future of steel bar prices. Concessions made in sales of shapes and plates are certainly not helpful to the maintenance of steel bar prices.

Possibility of another downward adjustment of wage scales by the leading producer is another element that prompts purchasing agents to play rather a waiting game when it comes to steel bar commitments. Officials of the wire drawing subsidiary of the leading producer stated that they did not announce any price cuts, but that they were meeting the prices of their competitors. Sheet bars and slabs continue to be quoted at $26, Pittsburgh.

The larger producers have heretofore permitted the smaller mills to set the pace in prices, but of late they have been fully as aggressive as the latter. There is a certain amount of business overhanging the market, much of it from automotive consumers, and all sellers in the steel market are in the race for as much of this business as they can possibly obtain. Steel wire prices were stationary for all of last year, largely for the reason that there never was enough business in sight at any one time to sufficiently whet competition. Now some market factors sense that certain business is to be had and they are going after it with all their might.

Pig Iron—Sales to automotive foundries in the Cleveland market are on the uptrend. A Michigan automotive foundry placed an order for 1500 tons with a Lake furnace, the first representative business since the placing of a blanket contract by General Motors. Sales of No. 2 foundry are reported at as low as $13.50, Cleveland furnace, while less competitive business goes at $14 @ $14.50, with the local Cleveland price $15.

Aluminum—Canadian exports in 1932 aggregated 18,345,000 pounds compared with 21,539,300 pounds in 1931. Market conditions are unchanged.

Copper—Dull and unchanged.

Tin—A rise in Sterling exchange caused the week's opening price for spot Straits to advance ⅛c to 22.80c.

Standards Committee Acts on

Lubricants, Cable, Trailer Couplings, Malleables, Ball Bearings, Non-Ferrous Metals, Etc.

Eight divisions of the Standards Committee made reports at the meeting of that committee, which took place at the Book-Cadillac Hotel in Detroit on January 24, in the course of the S.A.E. annual meeting.

Although the Lubricants Division was to have given further consideration to the subject of viscosity numbers for free-wheeling transmission lubricants, no action had been taken on it up to January 21, when a meeting of the division was held in Detroit. A classification of free-wheeling lubricants was approved by the division last June and has been published in

Turn to page 123, please

Chase Now Chilton Directing Editor

Blanchard Will Edit Automotive Industries

PHILADELPHIA, Jan. 25—Julian Chase has been appointed directing editor of the Chilton publications succeeding Norman G. Shidle who has resigned. Mr. Chase announces that Don Blanchard becomes editor of AUTOMOTIVE INDUSTRIES with this issue and that Mr. Blanchard will be succeeded in the editorship of *Automobile Trade Journal* by Leon F. Banigan who, since *Motor World Wholesale* was merged with the latter magazine, has been marketing editor of the Chilton Co.

Mr. Chase returns to the directing editor's chair after an absence of five years during which period he devoted his energies to the business management of AUTOMOTIVE INDUSTRIES. He brings to his new position long experience both in the automotive industry and in business paper publishing, having entered the field in the early days of Horseless Age.

Mr. Shidle, who has been directing editor since October, 1927, joined the AUTOMOTIVE INDUSTRIES staff in 1919 as an assistant editor. In 1924 he became editor. Subsequently he became a director of both the Chilton Co. and the United Business Publishers, Inc. His plans for the future include contributing regularly to a number of publications including AUTOMOTIVE INDUSTRIES as well as devoting part of his time to the editorship of the S.A.E. Journal.

Leon F. Banigan has assumed the editorship of Automobile Trade Journal

Don Blanchard is now to edit Automotive Industries

Julian Chase (center) returns to the chair of Directing Editor of the Chilton publications

Court Defers Action On Ford Subpoena

PHILADELPHIA, Jan. 25—Efforts made last week to force Henry Ford to testify in Detroit in a suit brought against the Ford Motor Co. by the receivers for the Sweeten Automobile Co., of Philadelphia, received a set-back Tuesday when arguments on a motion to quash service of subpoena on Mr. Ford were deferred by Circuit Judge Miller.

Service of the subpoena was so spectacular as to attract front-page notice all over the country. William C. Leland, Jr., 24, grandson of the founder of the Lincoln Motor Co., "crashed" a dance attended by Mr. Ford and served the paper before his intentions were known.

The suit grew out of a six-year-old dispute between the Sweeten Automobile Co., a former Philadelphia Lincoln dealer, since placed in receivership, and the Ford company. Mr. Ford's personal testimony is desired, the plaintiffs claim, because Mr. Ford promised personally to protect all Lincoln company creditors when he took over its operation.

Norman G. Shidle has resigned as Directing Editor of the Chilton publications

Reimar C. F. Kurtze

MILWAUKEE, Jan. 23—Reimar C. F. Kurtze, engineering genius who is credited with the design and perfection of machinery by which pressed steel automobile frames are made automatically in the plant of the A. O. Smith Corp., died at Youngstown, Ohio, on Jan. 18. He was born in Braunschweig, Germany, and in school was a classmate of the late Rudolf Diesel, inventor of the Diesel engine. After studying engineering, Mr. Kurtze went to South America and later to Canada, and in 1914 joined the A. O. Smith engineering staff, remaining until 1924. Burial took place at Chicago.

G.E. Orders Drop 52%

Orders received by the General Electric Co. during the year 1932 amounted to $121,725,772, compared with $252,021,496 for 1931, a decrease of 52 per cent, President Gerard Swope announced.

MEMA Will Hold Own Trade Show

Time and Place to Be Decided by Directors

NEW YORK, Jan. 23 — The Motor & Equipment Manufacturers Association will hold a trade show in 1933 "at such time and place as is for the best interests of the industry," according to a decision reached by its directors. According to an MEMA statement, the move has the endorsement of E. T. Satchell, president of the Motor & Equipment Wholesalers Association.

While the directors favor holding a joint show with the National Standard Parts Association, they feel that the interpretation placed on the NSPA resolution to hold its own show, makes a joint exhibition impossible. One of the advantages the directors see in an MEMA show is that the credentials committee can be dispensed with, thus permitting a relaxation of the strict rules governing admissions which have been enforced at previous exhibitions.

Geschelin S.A.E. Committee Head

DETROIT, Jan. 25—Fred W. Cederleaf, vice-president S.A.E. Production Activity, has announced the reappointment of Joseph Geschelin, engineering editor, AUTOMOTIVE INDUSTRIES, as chairman of the National meetings and papers committee of the Production Activity for 1933. This marks Mr. Geschelin's fourth consecutive term of service on this important committee.

De Haviland Loss

TORONTO, Ont., Jan. 23—Net loss of $29,155 is reported by De Haviland Aircraft of Canada, Ltd., in its annual statement for the fiscal year ended Sept. 30, 1932.

G. M. Has New House Organ

Circulation Limited to Employees for Present

Jan. 25—Vol. 1, No. 1 of the General Motors Magazine, a new house organ for employees of the corporation, made its appearance this week. The first issue is reported to have run 125,000 copies.

Attractive full-page layouts are given to each of the corporation's five-passenger car divisions. Article headings include the following: Here They Are, General Motors Presents Its New 1933 Cars; Employees Welcome New Models at Pre-Showings; Behind the Scenes at the General Motors Showing; Fisher Puts It Over; The New Radio Programs. All articles are not only profusely but well-illustrated.

Germans Using New Clutch

DETROIT, Jan. 24—Wolfgang Schoenborn, United States representative of the Knorr-Bremse A. G., has left for Germany Wednesday to attend the Berlin Automobile Show, at which several well-known German cars will be exhibited with a combination automatic clutch and gear shift mechanism developed by Knorr. Mr. Schoenborn will bring samples of the design back to the United States with him after the show.

Higgins Succeeds Allen at Norton

WORCESTER, MASS., Jan. 23—Aldus C. Higgins was elected president and general manager of the Norton Company at the company's annual meeting upon the retirement of Charles L. Allen, who has been the one and only general manager of that company for 47 years and its president since 1919. Although Mr. Allen has retired from executive participation in the affairs of the company, he was elected chairman of the board of directors and will still be in close touch with its business activities.

George N. Jeppson, vice-president in charge of production, was made treasurer to succeed Mr. Higgins.

Despite Free Entry, British Fail to Gain Foothold in Canadian Motor Market

Four Months After Imperial Conference, Giving Great Britain Preferences, No Move Has Been Made to Sell English Vehicles in Dominion

TORONTO, Jan. 23—Four months after the conclusion of the Imperial Economic Conference there is little evidence of headway on the part of the British automobile manufacturer in a move to gain a foothold in the Canadian market.

Machinery was set in motion at the Empire parley to provide for free entry of British motor vehicles into the Dominion. The point was assured when the business of the conference was concluded and it eventually became a recorded fact.

But in four months there has been no challenging announcement of the appointment of a distributor in Canada for a British-made car despite tariff concessions, a favorable monetary exchange situation or the receptive attitude of Canadian people toward British products.

Because of the admittedly restricted market in the Dominion, as compared with some other countries, the suggestion was thrown out that the establishment of an assembly plant and warehouse in Canada on a cooperative basis for all likely British car manufacturers would be suitable and appropriate as a start.

Canada has offered other cooperative features to the British industry. But none has availed himself of the privilege. It has been said that the cooperative instinct does not exist among the motor vehicles manufacturers of the United Kingdom.

After all the talk and cheers of the Imperial Conference, there has been a disappointing lack of enthusiasm on the part of the British companies with regard to the Canadian business.

In reply to an enquiry, an official of one prominent British firm wrote: "When we decide to enter the Canadian market we shall send a representative out from the factory to investigate" . . . and that's where the matter ended.

Another wrote: "No one really knows the possibility of British cars in Canada." And that was that.

A letter received recently in Canada said: "I am afraid there are many difficulties to be overcome."

Another reply: "We have not yet decided what our policy is likely to be in regard to the Canadian market."

These and other letters all show evidences of hesitancy—surely a lack of aggressiveness at a moment of prepared opportunity and invitation. Canadian firms have written to British makers, in fact, letters were written weeks ago, but there has been no announced result. In one or two instances, it is true, factory representatives have made the trip to Canada but it is understood that they did not go any further than Montreal, the first port of call.

A deterring factor for the development of Anglo-Canadian trade has been the refusal of British makers to change car design to meet Canadian standards and practices. They have declined to make the change to left-hand drive for exported cars because of the expense. In this, there is some justification when the cost alone in relation to immediate sales is considered. But the point is argued that, if a start is not made, there will never be any development.

Canadian factories have been asked repeatedly if negotiations are under way for the manufacture or assembly of a British car in Canada. The answer is "No."

The question has been asked as to whether British cars would be introduced at the mid-winter shows in Toronto or Montreal, or not. Again the answer has been in the negative.

Cadillac Creates New East-West Sales Areas

Chick Names Newton, Ahrens as Managers

DETROIT, Jan. 25—J. C. Chick, general sales manager, Cadillac announces following appointments revealing establishment of Eastern and Western sales areas under the direct supervision of assistant general sales managers with headquarters in Detroit. Western territory including districts of Detroit, Chicago, Kansas City, Dallas, Los Angeles and San Francisco is under Don E. Ahrens who has been assistant general sales manager for past three years. Eastern area with districts of New York, Philadelphia, Boston, Albany, Pittsburgh, Cincinnati is in charge of Ray L. Newton, former regional manager Eastern and Great Lakes regions.

Meinel Elected to Heintz Presidency

PHILADELPHIA, Jan. 24 — William J. Meinel has been elected president of the Heintz Manufacturing Co., succeeding Franklin W. Thatcher who becomes chairman of the board. Mr. Meinel joined the Heintz organization in June, 1932, as vice-president and general manager. Previously he was vice-president in charge of operations for the Edward G. Budd Manufacturing Co.

Howard C. Simpson

BRIDGEPORT, CONN., Jan. 19—Howard C. Simpson, vice-president of Raybestos-Manhattan, Inc., died at his home here of heart trouble. Prior to joining Raybestos-Manhattan in 1915, Mr. Simpson was connected with Chalmers and Hupmobile.

Rails Back Ton-Mile Tax Law in New York

Also Sponsor Drastic Law for Regulation of Rates of All Carriers

NEW YORK, Jan. 23—Railroads operating in New York State have prepared two bills, one providing for the taxation of commercial vehicles and the other for their regulation, which, it is expected, will be introduced in the state legislature shortly. Vehicles used by their owners in their own business and vehicles employed for hire within cities or villages would not be affected by the proposed laws. Both bills apply to buses as well as trucks.

The regulatory bill empowers the public service commission to regulate both common and contract carriers by means of certificates of convenience and necessity for the former class and by permits for the latter. Rates charged by common carriers would be subject to regulation and they would be protected from destructive competition by contract carriers. The bill also directs the commission to prevent unnecessary duplication of services between motor vehicles and other forms of transportation. Transportation for more than one shipper or delivery to more than three consignees is made prima facie evidence that the vehicle is a common carrier.

The tax bill provides for a levy of five mills on each gross ton-mile which would be levied on both intra and interstate carriers for hire. In addition, the bill would require all vehicles operated for hire in the state to have New York licenses thus ending reciprocity privileges now extended to vehicles of other states.

Cannon-Ball Baker With Graham

DETROIT, Jan. 23 — Robert C. Graham, vice-president of Graham-Paige Motors Corp., has announced that "Cannon-Ball" Baker has become a member of that organization, and will embark shortly on a nation-wide program for the promotion of motoring safety and the educating of dealers, salesmen and car owners on the factors which contribute to greater driving security. During the last year he set up a number of performance records in Graham cars.

De Soto Sales Continue Up

DETROIT, Jan. 24—For the fourth consecutive week, deliveries by DeSoto dealers have exceeded those of the corresponding week of last year by more than 100 per cent. For the week ended Jan. 14, DeSoto dealers delivered 859 new cars as compared with 348 for the corresponding period a year ago. The figures include Plymouth sales by DeSoto dealers.

At the same time, unfilled orders in hands of dealers totalled 1184 as compared with 465 on the corresponding date of last year. Unfilled orders at the factory amounted to 2161.

Used car sales by DeSoto dealers for the week totalled 1031 as compared with 741 for the corresponding week of last year.

Arthur L. Garford

ELYRIA, OHIO, Jan. 24—Arthur L. Garford, 74, inventor, industrialist and for many years identified with the automotive industry, died suddenly at his home here Jan. 23, from a heart attack.

At the time of his death he was president of the Cleveland Automatic Machine Co., and several other concerns.

He was the organizer and president of a $5,000,000 company to manufacture bicycle parts before 1900 and later organized the Garford Co. to manufacture automobiles and trucks.

The manufacturing plant was first at Cleveland, and later at Elyria. In 1912 it was sold to the Willys-Overland Co., at Toledo.

Michigan Dealers Hear Banigan and Buckman

DETROIT, Jan. 25—Leon F. Banigan, editor of *Automobile Trade Journal*, discussed the dealer's profit problem in 1933 before the annual meeting of the Michigan Automotive Trades Association. On the same program was Herbert Buckman, manager of the Cleveland Automobile Manufacturers and Dealers Association.

H. A. Gillies, new vice-president in charge of sales of the American Brake Materials Corp. He previously was sales manager of the same company

French Subsidies to Aviation Drop Little

PARIS (*Special*) — The French air budget for 1933 amounts to $83,855,480, a decrease of about 12 per cent under the appropriation for 1932.

Among important items pertaining to civil aviation are: $7,526,400 as subsidies to air lines; $333,200 for training civil pilots; $254,800 for "encouragement of touring and sanitary aviation"; $124,316 for development of aviation in general and $5,784,221 for research and the construction of prototypes.

The proposed subsidies to air lines are only $156,800 less than the appropriation for this purpose in the past few years; the proportional decrease in other items is considerably larger, except that of research and construction of prototypes which is about 15 per cent higher than last year.

The budget bill was referred to the finance committee of the chamber but has not been reported out, according to the Paris office of the U. S. Department of Commerce.

Briggs Increases Payroll by 3000

DETROIT, Jan. 25—According to officials of the Briggs Mfg. Co., employment at the company's Highland Park and Mack Avenue plants will total more by Mar. 1 than at any time since last June.

"About 1500 men have been called back to the Highland Park plant for full-time work since Jan. 1 and another 1500 will be called back within the next few weeks," a company official said.

General May Merge With N. A. Aviation

NEW YORK, Jan. 23 — North American Aviation, Inc., will be acquired by and merged with General Aviation Corp., in which General Motors has a 40 per cent interest, if negotiations reported to be under way reach a successful conclusion. Both organizations are holding companies with investments in both airplane manufacture and operation.

Lamotte T. Cohu, former president of the Aviation Corp., has just become a North American director. It will be recalled that he resigned from Aviation following E. L. Cord's historic battle for control of that company.

New Motors Featured At Annual Boat Show

Lycoming Exhibits New 12 and Buda Has Diesel Six

NEW YORK, an. 23—Power plants took the spotlight at the twenty-eighth annual Motor Boat Show at the Grand Central Palace. Many prominent engine builders, among others being Winton, Sterling, Palmer, Chrysler and Kermath, were represented as usual. Lycoming exhibited its latest line, including the new twelve, at unusually low prices for marine power plants.

Buda showed its latest M.A.N., "shock absorber head" diesel of the high-speed automotive type. It is called the Model 6-DM-415, and is a full diesel, 4x5-6 cyl. It develops 65 hp. at 1600 rpm., 85 hp. at 2000 rpm. The show model is of marine type weighing about 1560 without reduction gear. This engine undoubtedly will be offered for truck and tractor service as soon as certain preliminary test work has been completed.

Perhaps the most interesting feature of the Buda M.A.N. diesel is the fact that the crankcase and cylinder block are interchangeable with the current Hivelo gasoline engines. This means that diesels may be built on the assembly line by the addition of only a few special parts.

Another important development is the introduction of a new fuel injection and electrical ignition system by the Atlas Imperial Diesel Engine Co. This system is designed to be applied to standard L-head gasoline engines without any change except for different cylinder heads and combustion chambers. The conversion produces a low compression engine capable of burning low-grade fuels.

It is claimed that the Atlas system does not affect the performance or starting characteristics of the engine to which it is applied. In fact, the converted engine can be run at speeds equivalent to the fastest speed at which the gasoline job can be operated with high-test gasoline.

Marketing plans have not been announced as yet, although it is claimed that this system will be available shortly to manufacturers of stock engines. A complete description of the Atlas system will be published in *Automotive Industries* in an early issue.

Chrysler Diverts Exports to Canada

TORONTO, ONT., Jan. 23 — Announcement is made by W. Ledgard Mitchell, chairman of the board of the Chrysler Corp. of Canada, Ltd., that it is planned to release approximately 40 per cent of the total export shipments of the entire Chrysler organization through the Canadian plant at Windsor, Ont. It is understood that this switching of a large volume of business for export from Canada instead of from the United States, is a result of Imperial Conference agreements regarding automobiles, held last summer.

G. M. Profit Point Lower than in 1932

NEW YORK, Jan. 21—As the result of substantial reductions in operating expenses, General Motors this year will be able to duplicate its 1932 financial record on a considerably smaller volume of business, according to Dow, Jones & Co. Inasmuch as the final report for last year is expected to show that corporation broke even approximately, if 1933 sales equal 1932, the effect on this year's profits is obvious.

Dow Injured

MIDLAND, MICH., Jan. 23—Willard H. Dow, president of the Dow Chemical Co., was slightly injured recently in an explosion in the company's experimental laboratory.

CALENDAR OF COMING EVENTS

FOREIGN SHOWS

Berlin International .....Feb. 12-22

SHOWS

Portland, Me., Automobile Show Jan. 28-Feb. 4
National Automobile Show, Chicago .....Jan. 28-Feb. 4
Washington, D. C., Automobile Show .....Jan. 28-Feb. 5
Springfield, Mass., Automobile Show .....Jan. 30-Feb. 4
Lancaster, Pa., Automobile Show Feb. 1-4
Indianapolis, Ind., Automobile Show .....Feb. 4-11
St. Paul, Minn., Automobile Show Feb. 4-11
Omaha, Neb., Automobile Show, Feb. 6-10
Denver, Colo., Automobile Show Feb. 6-11
Springfield, Ill., Automobile Show Feb. 9-11
Kansas City Automobile Show.Feb. 11-18
Toledo, Ohio, Automobile Show.Feb. 11-18
Rapid City, S. D., Automobile Show Feb. 14-18
Peoria, Ill., Automobile Show..Feb. 15-19
Wichita, Kans., Automobile Show Feb. 21-24
Holyoke, Mass., Automobile Show .....Feb. 22-25
Evansville, Ind., Automobile Show Feb. 24-26
Albany, N. Y., Automobile Show Feb. 25-Mar. 4
Seattle, Wash., Automobile Show .. Feb. 26-Mar. 4
Des Moines, Iowa, Automobile Show .....Feb. 27-Mar. 4

Oppose New Taxes In Short Session

Committee Report to U. S. Chamber Asks Economies First

Opposition to federal tax increases in the present short session of Congress was voiced in a report to the Board of Directors by Redfield Proctor of Vermont, chairman of the U. S. Chamber of Commerce's Committee on Federal taxation.

The committee declared it inopportune to approach adjustments in taxes until after the March 15 income tax returns are received and until after it is seen to what extent Congress is ready to cut expenditures. Holding that the present Congress can and should balance the budget by reducing expenditures, it said:

Increases in the rate of income taxes or other taxes now being levied, or the addition of a manufacturers' sales tax or other new forms of new levies, with the possible exception of a beer tax, in the present short session of Congress are unwarranted. Instead, economies should be effected.

DuPont Net Rises in Fourth Quarter

WILMINGTON, Jan. 22—Fourth quarter earnings of the E. I. DuPont de Nemours & Co. were 45 cents a share on its common stock, according to a preliminary report by the company. This compares with 36 cents a share in the third quarter. Earnings in both quarters include dividends from General Motors amounting 23 cents per share of DuPont common.

Earnings for the entire year of 1932 were $1.82 per share of common against $4.29 per share in 1931.

Clarence E. Whitney

HARTFORD, CONN., Jan. 22 — Clarence E. Whitney, prominent manufacturer, died here today of a heart attack. Mr. Whitney was president of the Whitney Manufacturing Co., and the Hartford Faience Co., and secretary-treasurer of the Hanson-Whitney Co. and the Hanson Tap and Gauge Co. He was a charter member of the Motor and Equipment Association and his company made bicycle chains prior to making drive and turning chains.

Auto Lite Stocks Change

TOLEDO, Jan. 18—Electric Auto Lite Co. has called a special meeting of stockholders Feb. 7 to change 929,834 common shares from no par to $5 par value which officials declared was practically only a bookkeeping change.

NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

Buckeye Cup Wheel Grinder

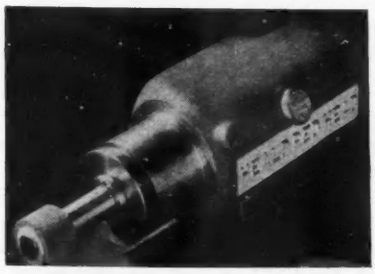
The specially designed high frequency motor designed for the Hercules belt sander, which was described in *Automotive Industries* for October 15, 1932, is also being used in the production of the new Hercules cup wheel grinder, model No. 382-E. This

grinder is used on weld seams, for surfacing large castings, and for grinding dies and flat metal.

Both are a part of the line of portable tools being built by The Buckeye Portable Tool Co., Dayton, Ohio.

Heald Red-Head Attachment for Internal Grinding

After a long trial period, The Heald Machine Co., Worcester, Mass., has brought out the "Red-Head" attachment for Heald internal grinders. This line of wheel heads is designed for great precision at high operating speeds, up to 42,000 rpm. on the series 80. One of the most important features in the design of this wheel



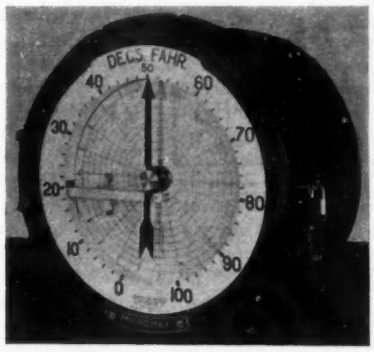
head is the special ball-bearing mounting of precision bearings set in Formica retainers. Over-all tolerances on bearings do not exceed 0.0002 in.

For convenience, the head is provided with open pulley construction to facilitate the changing of belts and pulleys. Pulleys can be provided for any size grinding wheel. Naked sleeve or quill type spindles are available in a variety of sizes.

Micromax Indicating Recorder

Among instrument displays at the Power Show was a new round-chart Micromax Indicating Recorder by Leeds & Northrup, Philadelphia, Pa. There were four of these single-point Model R Micromax instruments. Of these, one was recording CO_2 in the combustion range, and one was recording pressure over a range of 0-200 lbs. per sq. in. The third instrument was recording room temperatures and the fourth was recording temperatures in the range of 400-900° F.

This junior instrument is not capable of all that the strip-chart Micromax can do, but it brings reliability and low-cost maintenance of the

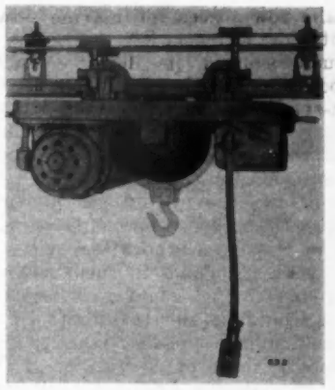


motor-driven null recorder to a price class that has never enjoyed these advantages before. This is especially valuable in pyrometers of about 400 to 900 or 1000° F. range. This instrument is also especially adapted to the recording of temperatures across the entire ranges of thermocouples, of resistance thermometers, to the recording of smoke density, liquid levels, SO_2, speed, solar radiation and many other applications.

American Monorail Unit

The American MonoRail Company, Cleveland, Ohio, has brought out an interesting development in motor-driven trolleys, the new feature being the use of an air or live rubber wheel to drive on the bottom of the Mono-Rail section. The high co-efficient of friction between the wheel and rail gives a non-slipping grip against the steel rail section. resulting in a powerful drive unit. Rail wear is eliminated and control problems simplified. Structural simplicity is obtained by driving one wheel in place of the conventional two or four wheels at present required. The same type of drive is applied to cranes and shows the same operating advantages.

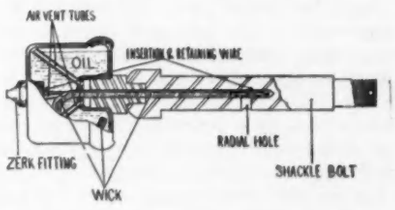
The overall efficiency of this drive on a long span crane of one-ton capacity, carrying an electric hoist and installed in a paper warehouse, is so high that with the current turned off, the crane under full load may be readily pulled along the craneway by hand from the hoist load hook at the floor level without disconnecting any drive parts.



Where close control is required, variable and multi-speed motors may be used as heretofore, but on a great many applications, due to high traction between the wheel and the rail, it now becomes possible to use the simpler squirrel cage type of motor.

Wix Oiler System

Universal Lubricator Company, Detroit, Mich., is offering to the trade the new Wix oiler system, which comprises individual wick-feed oilers for all chassis parts, except the rear axle and transmission. An air-venting device is provided in the oiler, which is claimed to make possible easy filling and flushing, and to prevent both air locks and vacuum, thereby assuring a constant film on the bearing surfaces. All bearing surfaces are automatically flushed every time the oilers are filled,



which keeps the bearing surfaces clean. The oil supply needs to be replenished only every 2500 miles, and it is claimed that this can be done quickly and economically by the owner or operator.

The Wix oiler is being manufactured in two types for trucks and buses, and in one type for passenger cars.

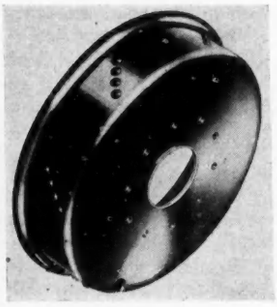
NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

Bossert Pres-I-Dent Brake Drums

A new type of brake drum for passenger cars and trucks, known as the Pres-I-Dent, has been announced by The Bossert Corporation of Utica, N. Y. According to the manufacturer, tests of these drums, both in the laboratory and on the road, have shown that they do not score, give greater retardation than other types, and permit of the use of linings that wear longer than those commonly used.

The Bossert Corporation, after extensive tests, came to the conclusion that if scoring could be prevented, steel would be the best material for brake drums from every point of view, including those of co-efficient of friction, workability, and cost. The Pres-



I-Dent brake drum, therefore, is made of steel and embodies features designed to prevent scoring. It is provided with indents or cups in the contact surface designed to gather the particles of metal that wear off, so as to prevent their accumulation on the lining in the form of scales. The metal particles thus do not become embedded in the lining to form a cutting tool that in time causes uneven wear or scoring of the drum.

The Bossert Corporation states that while the same principle is applicable to cast iron drums, it is applying the principle to steel drums first, for the reason that steel drums have definite advantages from the points of view of faster retardation, less unsprung weight, lower cost, and less danger of breakage.

Bantam Roller Bearings

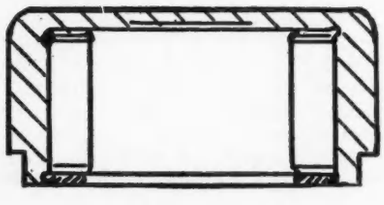
Bantam Ball Bearing Company, South Bend, Ind., calls attention to the fact that it and its predecessors have manufactured small rollers since 1898. W. S. Rogers, who founded the present Bantam Ball Bearing Company, in 1899 prepared a catalogue which is said to have been the first commercial catalogue of ball and roller bearings issued in this country. It showed a vehicle axle ¾-in. in diameter, equipped with roller bearings using ⅛-in. rollers.

Since that early period, the Bantam company has made many different applications of small roller bearings, but considerable production was reached only recently. The rollers are now being manufactured in large numbers in sizes ranging from 0.0625 in. to 0.1880 in. in diameter, with tolerances of from plus and minus 0.0001 to 0.0002 in.

It is stated that these small-roller bearings exceed all other types of bearings in carrying capacity. These roller bearings are used in universal joints, on Diesel-engine piston pins and crankshafts, in high-speed marine engines, printing presses, gears, pumps, transmissions, high-speed drills and other machine tools, automotive brakes and in rocker arms. They are particularly adapted for use wherever very limited space and peculiar operating conditions require greater bearing capacity than is obtainable with other types of bearings.

Unusual difficulties arise in the production of these small rollers in connection with heat-treating, grinding and inspection operations, and special methods have been developed. No standards have yet been set for these bearings of recent introduction, but quantity production is under way on the sizes given in the following table and those marked with an asterisk are proposed as standard sizes.

*.0625	Diameter	by	.625	Long
.0625	"	by	.656	"
.0937	"	by	.484	"
*.0937	"	by	.750	"
.1250	"	by	.375	"
.1250	"	by	.750	"
*.1250	"	by	.875	"
*.1870	"	by	1.000	"
.1880	"	by	.922	"



New Small Capacity Jig Boring Machine

A small precision lay-out and boring machine, made by the Société Genevoise, is being introduced by their American agents, The R. Y. Ferner Co., Investment Bldg., Washington, D. C. It has a working capacity of 8 x 12 inches, which adapts it to the field of tools and development work in the lighter mechanical industries.

The unique feature of this machine is the fact that the work table rests directly on the bed of the machine and can be placed in any position within its range by direct movement on the wide flat ways of the machine bed.

A second unique feature of this machine, compared with other models of the GSIP Swiss jig borers, is the provision of vertical motion only for the boring head mounted on a single column, on which the slide can be moved through 9½ inches by a rack and pinion for rapid traverse when changing tools. The spindle itself has a feed of 4 inches and a wide range of speeds, from 190 to 3000 rpm. This permits drilling holes with a No. 55 drill, or even smaller, and boring of holes as large as 1⅝ inches. The spindle is driven by a built-in motor mounted on the spindle slide and acting through a 6-speed gear box in the middle of the slide. The weight of both the boring spindle and the whole boring head is counterpoised by a single weight in the column acting on a differential lever.

Hi-Duty Tube Coupling

The Imperial Brass Manufacturing Company, Chicago, Ill., announces the issuing of a patent on their Hi-Duty Tube Coupling.

Hi-Duty Tube Couplings are for use on Copper, Shelby, Aluminum, Bundyweld, Everdur, Monel and Steel Tubing for automobiles, trucks, tractors, buses, airplanes, air compressors, machine tools, motor boats, gas engines, etc.

S. A. E. Standards Committee Acts

(*Continued from page 116*)

the Standards Handbook Supplement as information only; it is planned to make the numbers a "recommended practice."

A revision of the present standard for insulated cable was proposed by the Electrical Equipment Division. Several changes in the specifications for insulation and tests were proposed, as well as the addition of two new sizes to the list of lighting and starting cables, Nos. 20 and 22.

The Iron and Steel Division, which had been considering the standard definitions of terms relating to heat-treatment operations that were formulated some years ago by a joint committee of the S.A.E., the A.S.T.M. and the A.S.H.T., recommended that in the introductory paragraph the statement that in some localities "to anneal" means not primarily to soften but to heat to above the critical temperature and cool very slowly, the word "range" be inserted after "critical temperature."

The report on headlights was withdrawn pending approval of Illuminating Engineering Society.

The present S.A.E. specification of malleable iron castings was taken over from the A.S.T.M. Recently the latter organization has added another grade of malleable iron, No. 35018. It is now proposed that this new grade be included also in the S.A.E. standard. This iron must show a tensile strength of 53,000 lb. per sq. in., a yield point of 35,000 lb. per sq. in., and an elongation of 18.0 per cent in 2 in. The yield point, defined as that load under which the specimen has an elongation in 2 in. of 0.01 in., may be determined by the drop of the beam of the testing machine, or by the divider method.

The Motor Coach and Motor Truck Division recommended for adoption as a S.A.E. standard, two sizes of pintle eyes for tractor-trailer couplings. These eyes are said to conform to or interchange on practically all pintle hooks now being used, and will require the least amount of change in existing forging dies. Both eyes have inside diameters of 2⅝ in., minus zero, plus ⅛ in., and 5⅝ in. outside diameter, with a substantially oval section which is ¾-in. thick in the light-duty size and 1¼ in. in the heavy-duty size.

In addition the coach and truck division submitted a special progress report on the definition of what comprises a standard chassis.

A rather lengthy report was made by the Non-Ferrous Metals Division which some time ago started on a review of the present non-ferrous metals specifications with the view of bringing them up to date. Certain changes in the specifications for wrought aluminum alloys were proposed for adoption. These include the physical properties and the tolerances of duralumin in rod, sheet and bar form, and weight tolerances on structural shapes of aluminum. Slight changes were proposed in the compositions of aluminum alloys Nos. 33 and 34.

Specification No. 69 (aluminum bronze) is to be known hereafter as No. 701 and is to be changed to the following: Copper, 88.00 to 95.00; aluminum, 4.50 to 10.00; iron (max.), 4.00; nickel, manganese and tin (max.), 2.00; other impurities, including zinc and lead (max.), 0.25.

Three new grades of commercial brass sheet are to be classed under No. 70, two of them corresponding to present A.S.T.M. standards (B-36 Grades 1 and 2) and one grade not corresponding to any A.S.T.M. specifications. In Specification No. 72, Free-Cutting Brass Rod, the lead content is to be changed from 2.25-3.25 to 2.50 to 3.75 and the maximum content of other elements from 0.25 to 0.50. Specification No. 73, Naval Brass Rod, is to be changed to give the copper content as 59.00-61.00 and the tin content as 0.50-1.00 per cent. Specification No. 78, Aluminum Sheet and Strip, is to be renumbered 25 and to be placed at the head of the aluminum alloys group, the reason for this change being that the alloy really belongs in the wrought aluminum group. The present paragraph on Physical Properties of phosphor bronze strip (Specification No. 77) is to be replaced by the following:

"Aluminum sheet or strip of commercial purity is produced in several tempers or degrees of hardness, secured by the introduction of definite amounts of strain-hardening by cold rolling after annealing in the process of manufacture."

In the past, temper was designated by the amount of reduction in thickness after annealing, expressed in terms of the number of American wire gage sizes (Brown & Sharpe) included between the final annealing thickness and the thickness of the finished sheet. It is now common practice to use fractional temper designations to indicate the increase in tensile strength between the soft and hard tempers. The mechanical properties of aluminum sheet and strip in the soft, half hard, five-eighths hard and hard conditions were given in tabular form in the proposal.

In Specification No. 83 (Soft or Annealed Copper Wire) the diameter ranges in a table of minimum tensile strength were changed to conform to a similar table in A.S.T.M. Specification No. B3-27. To the "General Information" printed in connection with Specification No. 88 (Brass Rod) there is to be added the following:

"Hot-pressed forgings of this alloy should have the following nominal physical properties: Ultimate strength, 45,000 lb. per sq. in.; yield point, 18,000 lb. per sq. in.; elongation in 2 in., 25 per cent."

These forgings should have dense, even grain with good machining properties. Except for the "General Information" this specification conforms to A.S.T.M. Specification No. B15-18.

A new specification, No. 79 (Red Brass Sheet) was proposed, as follows:

Composition in Percentage		
	Grade A	*Grade B*
Copper	83.0-86.0	79.00-82.00
Lead, max.	0.15	0.20
Iron, max.	0.06	0.05
Other Impurities, max.	0.10	0.10
Zinc	Remainder	Remainder

Mechanical Requirements

Temper and Anneal: The temper of sheet red brass shall be designated as follows: Quarter-hard-Reduction in B. & S. gage numbers, 1; Four other common tempers are made but are not used in the manufacture of radiators or lamps. The annealed sheet shall be designated as follows: Light anneal, drawing anneal, soft drawing anneal. Tables of ultimate strength and of Rockwell hardness for Grades A and B material are included in the specification. Grain size is to be determined by the Jefferies method at 75 magnifications.

Proposals by the Aircraft Division were in the nature of changes in existing standards and recommended practices, and of corrections of these as now printed in the Handbook. All of the revisions were of a minor character and were made in order to bring the S.A.E. standards into line with the latest Army-Navy practice.

The Ball and Roller Bearing Division proposed the adoption of 25.4 as the standard conversion ratio from millimeters to inches and vice versa. It also proposed the adoption, as an American recommended practice, of a number of large sizes of angular-contact ball bearings which are now in regular production. These bearings, however, are not to be included in the S.A.E. standard, partly because they are beyond the automotive range of sizes and also because their bores and outside diameters are not in conformity with the bores and outside diameters of the S.A.E. and international standard annular ball bearings. A further proposal was to the effect that a series of adapter-sleeve bearings, which was originally worked up in 1926 at the request of a foreign standardization body, be adopted as an American standard, after eliminating the 1¼, 2, 3¼ and 4-in. sizes. The report of this division also contained a table of dimensions of lock nuts and washers for ball bearings, a table of new (and the corresponding old) numbers for taper roller bearings in the light, medium and heavy series; a table of dimensions of steering-knuckle type ball and roller thrust bearings, and a table of dimensions of angular-contact ball bearings.

Last year the Sectional Committee on Bolt, Nut and Rivet Proportions of the American Standards Association suggested that the S.A.E. formulate a specification for standard cap nuts, inasmuch as these are used predominantly by the automobile industry. Accordingly data were gathered by the Screw Threads Division of the S.A.E. Standards Committee from manufacturers and users of these nuts, as to their dimensions, and a tentative proposal was published. Since that time the Sectional Committee has made certain revisions in the American standard for wrench-head bolts and nuts and wrench openings which necessitated a revision of the cap nut proposal. With these revisions made, the proposal was presented at the meeting by the Screw Threads Division.

STEWART

AUTOMATIC "*Full*

new
PIERCE-ARROW
uses
STEWART-WARNER
Automatic "*Full Power*" Brakes

Pierce-Arrow is the first American car to install *complete* Mechanical Power Brakes.

Pierce-Arrow Engineering Staff—after a year of rigorous road and laboratory test—chose Stewart-Warner Automatic "*Full Power*" Brakes as offering the ultimate in protection for Pierce-Arrow owners.

Such a decision from an organization which has upheld the highest standards of sound engineering practice for over three decades, is greatly prized. It is an appreciated confirmation of Stewart-Warner's 600,000 miles of testing development.

SEE PIERCE-ARROW EXHIBIT AT THE SHOW

SEE DEMONSTRATING EXHIBIT OF STEWART-WARNER AUTOMATIC

WARNER

Power" BRAKES *will sell more cars* IN 1933

SEE ALL—COMPARE ALL BRAKE EXHIBITS AT THE SHOW. SUCH AN INVESTIGATION WILL CONFIRM THE FOLLOWING STATEMENTS:

Stewart-Warner offers the *only instantly responsive braking system* to utilize the giant force of car momentum as a braking force—under complete control of the driver.

A more accurate, more dependable control is assured by Stewart-Warner Automatic *"Full Power"* Brakes than by brakes using assistors such as vacuum boosters, or other devices to supplement human effort.

Power Unit independent of engine operation, as it utilizes car momentum as a braking force—a force that costs nothing—and is always proportioned to meet the needs of load, road and speed.

Saves split-seconds in braking. Stewart-Warner Brakes are faster. Driver's foot swings from accelerator to low Stewart-Warner Brake pedal instantly and he is braking before he could even *get* his foot on an *ordinary* brake pedal. —And 60% of full braking force is attained at a pedal travel which would barely *start* ordinary brakes into operation.

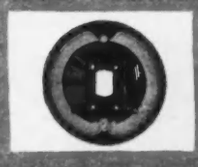
Straight-line Stopping. Even without the power unit, Stewart-Warner Wheel Brakes offer outstanding advantages over other pedal-operated jobs. Ask why these brakes are *safe* on curves —Why car stops in a straight line even on slippery pavement—Why adjustments are required only at from 10,000 to 20,000-mile intervals—Why adjustment requires only a wrench, screw driver, and a few moments' time.

Stewart-Warner Automatic *"Full Power"* Brakes are for factory installation, but we will be glad to give dealers and service men the full story. Our engineers are at the command of manufacturers of cars, motor coaches and trucks, who are looking for better brake protection to meet today's speeds and needs. Stewart-Warner Corporation, Brake Division, Chicago, or 6050 Cass Ave., Detroit.

HOW STEWART-WARNER AUTOMATIC "FULL POWER" BRAKES WORK

The human foot on the Stewart-Warner Brake Pedal—no higher than a foot accelerator—

controls this Mechanical Foot which harnesses the giant force of car momentum to apply—



these non-"grabbing" Stewart-Warner rigid, two-shoe, Wheel Brakes.

"Full Power" BRAKES AT THE CHICAGO AUTOMOBILE SHOW

Here Is An Outline of t
Responsible for the *Intense* R
15th Annual S
of
AUTOMOTIVE

World Registrations

Trend of World & U. S. Registrations 1919-1932 Chart
Summary of World Registrations 1932
Foreign Registrations 1925-1932
U. S. Registrations 1895-1932
U. S. Motor Vehicle Registrations by States 1931-1932
U. S. Motor Vehicle Registrations by States 1927-1932
U. S. Motor Vehicle Taxes (Registration and Gas Tax)
World Registrations by Countries

Motor Vehicle Production

World Production Trends 1924-1932 Chart
Canadian Motor Vehicle Production 1922-1932
1932 Production Summary
World Car and Truck Production 1930-1932
Truck Production by Capacities 1928-1932
Estimated Number of U. S. Passenger Cars Scrapped in 1923-1932
Percentage of Scrapped Cars Junked by Factories in 1932
European Production Totals 1924-1932
Division of Passenger Car Production by Number of Engine Cylinders 1926-1932
Motor Vehicle Production U. S. & Canada 1912-1932
Passenger Car Production by Leading Mfg. Groups 1927-1932
Monthly Motor Vehicle Production 1925-1932

General Statistics

Open & Closed Car Production by Retail Price Classes 1921-1932
Percentage of Passenger Car Production (By Retail Price Classes) 1921-1932
Per Cent of Car Production by Body Types 1928-1932
Raw Materials used in Automotive Industry 1932
Tire Production by Types 1926-1932
New and Used Car Financing Data 1930-1932
U. S. Production and Sales of Airplanes 1932
Gasoline Consumption by States 1932
Export Value of Aircraft Engines and Parts—Chart
Aircraft Exports 1929-1932
U. S. Airplane Production 1925-1932
U. S. Airplane Engine Production 1926-1932
Scheduled Transport Operations of American Air Lines 1927-1932
Census of Numbered Motor Boats

Published February 25th

It Lives

AUTOMOTIVE

A Chilton

Chestnut and 56th Sts.,

DIVISION OF
UNITED BUSINESS PUBLISHERS
INCORPORATED

the FACTS and FIGURES READER INTEREST In The Statistical Issue

INDUSTRIES

Automotive Marketing Data

New Car Domestic Sales by Makes 1929-1932
1932 Passenger Car Sales by States
Average Retail Price of Trucks (Chart and Table) 1921-1932
World Distribution of Automotive Sales Outlets
New Motor Vehicle Sales per Dealer (Chart and Table) 1924-1932
Average Retail Price of Passenger Cars (Chart and Table) 1921-1932
Sales Outlets and Population by States

Exports

Total Foreign Consumption of Motor Vehicles of U. S. Design 1914-1932
Imports into U. S. of Motor Vehicles 1918-1932
Foreign Sales of American Motor Vehicles 1921-1932
Ratio of U. S. Exports to Production 1923-1932
Passenger Car and Truck Exports
U. S. Exports of Parts and Accessories

Automotive Insurance Statistics

Latest available figures on all phases of automotive insurance—for the first time in a Statistical Issue of AUTOMOTIVE INDUSTRIES. The volume of automotive casualty, fire and theft insurance will be recorded, together with the loss ratio of leading insurance companies on this automotive business.

Specifications Section

(42 pages)

American Passenger Car Engines
American Passenger Car Chassis
Price, Weight & Body Tables
American Agricultural Tractors
American Trucks
American Gasoline Bus Chassis
American Stock Engines
American and Foreign High Speed Diesel Engines
American Stock Rear Axles
American Stock Gearsets
American Stock Steering Gears
American Stock Front Axles
American Stock Clutches
American Airplanes
American Airplane Engines

Forms Close February 20th

A Year

INDUSTRIES

Publication
Philadelphia, Pa.

DIVISION OF UNITED BUSINESS PUBLISHERS INCORPORATED

DEOXIDINE—
Prepares Auto Bodies for Painting
RODINE—
Pickle Bath Control
STRIPPLE
High Speed Enamel Remover
PEROLINE—
Rust Preventing Oil
KEMICK—
Manifold Paint
FLOSOL—
Soldering Flux
PARADOX—
Rust Proofing Enamel
AMERICAN CHEMICAL PAINT CO.
AMBLER, PENNA.

AMERICAN SPRING AND MFG. CORP.
SPRINGS—COIL and FLAT
WIRE FORMS
HOLLY, MICHIGAN

CHAMBERSBURG-NATIONAL
COMPLETE FORGING EQUIPMENT
CHAMBERSBURG ENGINEERING CO.
CHAMBERSBURG, PA.
THE NATIONAL MACHINERY CO.
TIFFIN, OHIO
Sales Offices
NEW YORK, 152 W. 42nd St. CHICAGO, 565 W. Washington St.
DETROIT, 2457 Woodward Ave.

NAME PLATES — ALL KINDS
Vitreous enameled, embossed, bronze, chrome plated, brass, etc.
Tell us the purpose and we will design a plate for your approval.
THE D. L. AULD CO.
COLUMBUS, OHIO

DIAMOND Vulcanized Fibre
Sheets, rods, tubes, washers and special shapes, to meet every insulating need
Also CELORON Timing Gears and DILECTO.
CONTINENTAL-DIAMOND FIBRE CO.
Newark, Delaware

INDUSTRIAL FURNACES
Send for BULLETINS
ELECTRIC AND FUEL FIRED
THE ELECTRIC FURNACE CO - Salem, Ohio

QUALITY STAMPINGS
FENDERS
DUST SHIELDS
RUNNING BOARD SHIELDS
RUNNING BOARDS
HOODS
RADIATOR SHIELDS
BODY STAMPINGS
MOTORS METAL MFG. CO.
5936 Milford Ave. Detroit, Mich.

PIG IRON
SEMIFINISHED STEEL
BARS & SHAPES
SKELP
SHEETS
PIPE
SPECIALTIES
ENDURO-REPUBLIC'S PERFECTED STAINLESS STEEL
AGATHON ALLOY STEELS
REPUBLIC STEEL CORP.
YOUNGSTOWN, OHIO

BUYERS' GUIDE

Automotive Products and Factory Equipment Manufactured by Advertisers in This Issue

See Alphabetical List of Advertisers on Page 40

This Advertiser's Index is published as a convenience, and not as part of the advertising contract. Every care will be taken to index correctly. No allowance will be made for errors or failure to insert.

Arms & Knuckles, Steering
Atlas Drop Forge Co.

Axles
Atlas Drop Forge Co.

Bearings, Anti-Friction
Timken Roller Bearing Co.

Bending & Straightening Machines
Chambersburg Engineering Co.
Chambersburg National Co.
Cleveland Punch & Shear Works Co.
National Machinery Co.

Blanks
Forged
Atlas Drop Forge Co.

Boring Machines
Baker Bros., Inc.
Foote-Burt Co.

Brake Boosters
Bragg Kliesrath Co.
Stewart-Warner Corp.

Brake Drums
Gunite Foundries Corp.

Brakes
Air
Bendix - Westinghouse Automotive Air Brake Co.
Mechanical
Stewart-Warner Corp.

Bumpers
Stewart-Warner Corp.

Bushings
Fibre
Continental - Diamond Fibre Co.

Camshafts
Atlas Drop Forge Co.
Gunite Foundries Corp.

Castings
Gray Iron
Gunite Foundries Corp.
Malleable Iron
Timken Roller Bearing Co.

Channels for Glass
Felt
American Felt Co.

Cleaners
Metal
American Chemical Paint Co. (Rust Preventive)

Compressors, Air
Bendix - Westinghouse Automotive Air Brake Co.

Connecting Rods
Atlas Drop Forge Co.

Crankshafts
Atlas Drop Forge Co.

Cutters
Baker Bros., Inc. (Keyseating)
Fellows Gear Shaper Co. (Gear)

Drilling Machines
Baker Brothers, Inc.
Foote-Burt Co.

Enamels
American Chemical Paint Co. (Rust Proofing)
Bakelite Corp.

Felt
American Felt Co.

Fenders
Motors Metal Corp.

Fibre Rods, Sheets, Tubes
Continental - Diamond Fibre Co.

Forgings
Atlas Drop Forge Co.

Furnaces, Electric
(Annealing, Carburizing, Heat Treating, Forging and Welding)
Electric Furnace Co.

Gaskets
Felt
American Felt Co.

Gear Cutting Machines
Fellows Gear Shaper Co. (Shapers)

Gear Material
Non-Metallic
Bakelite Corp.
Continental - Diamond Fibre Co.

Gears
Timing, Non-Metallic
Continental - Diamond Fibre Co.

Grinding Machines
Fellows Gear Shaper Co.

Hammers
Power
Chambersburg Engineering Co.
Chambersburg National Co.
National Machinery Co.

Heat Treating
Barnes Co., Wallace
Barnes - Gibson - Raymond, Inc.
Gibson, Wm. D., Co.

Heaters, Car
Stewart-Warner Corp.

Hoods
Motors Metal Corp.

Hose, Flexible Metallic
(Radiator and Fuel Lines)
Titeflex Metal Hose Co.

Hubs
Gunite Foundries Corp. (Wheel)

Insulating Material
Bakelite Corp.
Continental - Diamond Fibre Co.

Pioneers in Better Drilling Methods

FOOTBURT

Single and multiple spindle special drilling, boring, reaming, tapping machine and FOOTBURT Sipp Sensitive Drilling Machines
THE FOOTE-BURT COMPANY CLEVELAND, OHIO

The OHIO SEAMLESS TUBE CO.
COLD DRAWN SEAMLESS STEEL TUBING
Shelby, OHIO

10 to 20 per cent
SAVING IN FUEL
WITH
Steam Cooling
Rushmore Laboratory
PLAINFIELD • NEW JERSEY

FELT
AMERICAN FELT CO.
NEW YORK DETROIT CHICAGO

BAKER
DRILLING : BORING and TAPPING EQUIPMENT
A complete line including gear or hydraulic feed, single or multiple spindle; vertical, horizontal and way type.
BAKER BROTHERS, INC. TOLEDO, OHIO

CLEVELAND
POWER FOR PROFITABLE PRODUCTION PRESSES
THE CLEVELAND PUNCH & SHEAR WORKS COMPANY
CLEVELAND, OHIO

GUNITE
ROCKER ARMS
CLUTCH PRESSURE PLATES
GUNITE FOUNDRIES CORP., ROCKFORD, ILLINOIS

BUYERS' GUIDE—Continued

Keyseaters
Baker Brothers, Inc.

Lapping Machines
Fellows Gear Shaper Co.

Lathes
Automatic Chucking
Potter & Johnston Machine Co.
Turret
Potter & Johnston Machine Co.

Molded or Machined Parts (Phenolic)
Bakelite Corp.
Continental - Diamond Fibre Co.

Name Plates
Auld, D. L., Co.

Pads
Felt
American Felt Co.

Paints
Heat Resisting
American Chemical Paint Co.

Pickling Compounds
American Chemical Paint Co.

Plates, Clutch Pressure
Gunite Foundries Corp.

Presses
Chambersburg Engineering Co.
Chambersburg National Co.
Cleveland Punch & Shear Works Co.
National Machinery Co.

Punches
Cleveland Punch & Shear Works Co.

Radiator Shells
Motors Metal Corp.

Radiators
Young Radiator Co.

Removers, Enamel and Paint
American Chemical Paint Co.

Running Boards
Metal
Motors Metal Corp.

Rust Removers & Preventives
American Chemical Paint Co.

Screw Machine Products
Barnes Co., Wallace

Screw Machines
Potter & Johnston Machine Co.

Shears
Cleveland Punch & Shear Works Co.

Sheet Metal Machines
Cleveland Punch & Shear Works Co.

Shock Absorbers
Stewart-Warner Corp.

Special Machinery
Baker Brothers, Inc.

Speedometers and Tachometers
Stewart-Warner Corp.

Springs
Extension, Compression, Torsion or Flat
American Spring & Mfg. Corp.
Barnes Co., Wallace
Barnes - Gibson - Raymond, Inc.
Cook Spring Div.
Gibson, Wm. D., Co.
Raymond Mfg. Co.

Stampings or Drawings, Metal
Auld, D. L., Co.
Barnes Co., Wallace
Barnes - Gibson - Raymond, Inc.
Cook Spring Div.
Gibson, Wm. D., Co.
Motors Metal Corp.
Raymond Mfg. Co.
Worcester Stamped Metal Co.

Steam Cooling
Rushmore Laboratory

Steel
Alloy
Republic Steel Corp.
Timken Roller Bearing Co.
Bars
Republic Steel Corp.
Timken Roller Bearing Co.
Billets
Timken Roller Bearing Co.
Carbon
Republic Steel Corp.
Timken Roller Bearing Co.
Cold Drawn
Republic Steel Corp.
Electric Furnace
Timken Roller Bearing Co.
Spring
Barnes Co., Wallace
Barnes - Gibson - Raymond, Inc.
Gibson, Wm. D., Co.
Stainless
Republic Steel Corp.
Strip
Republic Steel Corp.
Tool
Timken Roller Bearing Co.

Tapping Machines
Baker Bros., Inc.
Foote-Burt Co.

Thread Generators
Fellows Gear Shaper Co.

Tubes, Axel, Steering Column & Torque
Ohio Seamless Tube Co.

Tubing
Flexible Metal
Titeflex Metal Hose Co.
Seamless
Ohio Seamless Tube Co.
Steel
Ohio Seamless Tube Co.

Tubular Products
Ohio Seamless Tube Co.

Turret Machines, Automatic
Potter & Johnston Machine Co.

Vacuum Tanks
Stewart-Warner Corp.

Varnishes
Bakelite Corp.

Washers
Felt
American Felt Co.

Wicks, Felt
American Felt Co.

Windshield Wipers
Stewart-Warner Corp.

Wire
Flat, Round, Square or Special Shape
Barnes Co., Wallace
Spring
Barnes Co., Wallace
Republic Steel Corp.

Wrenches
Gunite Foundries Corp.

Crankshafts BY ATLAS

Final inspection of Atlas multiple-throw crankshaft

A perfect multiple-throw crankshaft is the standard of excellence in drop forging manufacture. Atlas grew up with, and helped materially in evolving the modern crankshaft. Atlas skill, which aided so effectively in this most difficult achievement, is imparted to 340 other types of drop forgings, ranging from two ounces to 500 lbs., and used by sixty-four manufacturers of highly diversified products.

ATLAS DROP FORGE CO.
LANSING, MICH.

P&J FOR OVER A QUARTER OF A CENTURY P&J
THE PIONEER MANUFACTURER OF AUTOMATIC CHUCKING EQUIPMENT
POTTER & JOHNSTON MACH. CO.
PAWTUCKET, R. I., U. S. A.

YOUNG
Heat Transfer Products

Standard Equipment on all types of units from the tiny cores for automobile hot water heaters to Diesel engine radiators for cooling thousands of horsepower. Most modern laboratory and engineering facilities.

YOUNG RADIATOR COMPANY
Racine 707 Mead St. Wisconsin

Pacific Coast Representative
W. H. BENDUHN
664 Mission St.
San Francisco

Young Quality
Reg. U. S. Pat. Off.

© Y. R. Co.

YOUNG RADIATORS ARE USED WHERE THE GOING IS TOUGH

Index to Advertisers

The Advertisers' Index is published as a convenience, and not as a part of the Advertising contract. Every care will be taken to index correctly. No allowance will be made for errors or failure to insert.

A

American Chemical Paint Co. 38
American Felt Co. 39
American Spring & Mfg. Corp. 38
Atlas Drop Forge Co. 40
Auld Co., D. L. 38
Automotive Industries 36-37

B

Baker Brothers, Inc. . 39
Bakelite Corp. Third Cover
Bragg-Kliesrath Corp. (Subsidiary of Bendix Aviation Corp.) Back Cover
Bendix Westinghouse Automotive Air Brake Co. 2

C

Chambersburg Engineering Co. 38
Cleveland Punch & Shear Works Co. .. 39
Continental - Diamond Fibre Co. 38

E

Electric Furnace Co. 38

F

Fellows Gear Shaper Co. .....Second Cover
Foote-Burt Co. 39

G

Gunite Foundries Corp. 39

M

Motors Metal Mfg. Co. 38

N

National Machinery Co. 38

O

Ohio Seamless Tube Co. 39

P

Potter & Johnston Machine Co. 40

R

Raymond Mfg. Co. .. 1
Republic Steel Corp. . 38
Rushmore Laboratory 39

S

Stewart-Warner Corp. . 34-35

T

Timken Roller Bearing Co. .....Front Cover

W

Worcester Stamped Metal Co. 40

Y

Young Radiator Co. .. 40

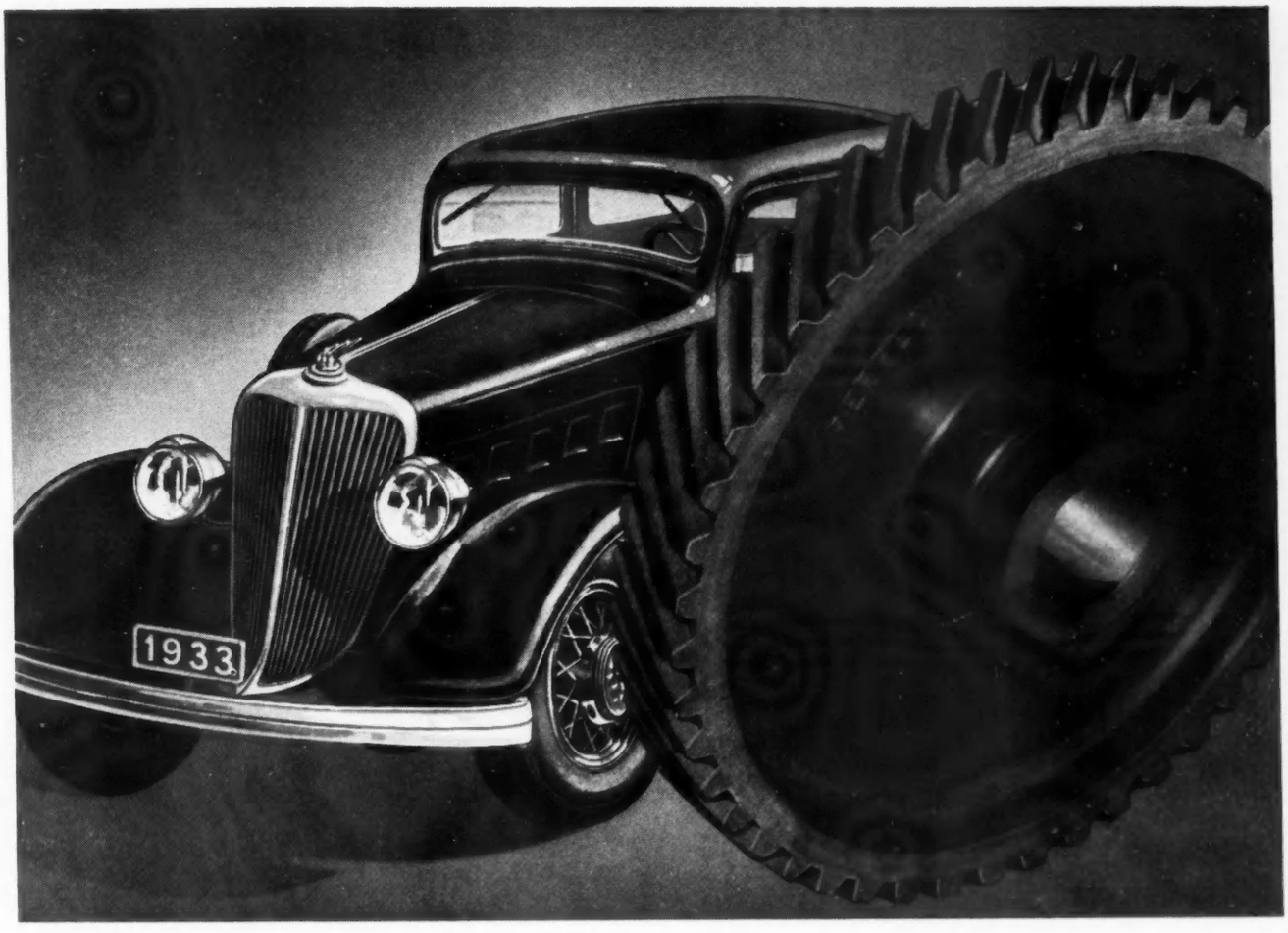
STAMPINGS

WORCESTER STAMPED METAL © · QUALITY STAMPINGS

Heavy, medium and light stampings in any quantity. A steady flow of production—*when* you want it.

WORCESTER STAMPED METAL CO.
Worcester, Mass.

WORCESTER STAMPED METAL © · QUALITY STAMPINGS



Styles Change–but real styling in motor cars continues to include BAKELITE Laminated Gears for silencing timing gear trains . . . .

BAKELITE CORPORATION, 247 Park Ave., New York, N.Y. 43 E. Ohio St., Chicago, Ill.
BAKELITE CORPORATION OF CANADA, LIMITED, 163 Dufferin St., Toronto, Ontario, Canada

BAKELITE

REGISTERED U. S. PAT. OFF.

The registered trade marks shown above distinguish materials manufactured by Bakelite Corporation. Under the capital "B" is the numerical sign for infinity, or unlimited quantity. It symbolizes the infinite number of present and future uses of Bakelite Corporation's products.

THE MATERIAL OF A THOUSAND USES

A message

to men who sell motor cars

IT doesn't take any excess of gray matter to sell an automobile by making an overwhelming allowance on "the old bus." Real salesmanship is presenting your car's advantages so impressively that the prospect *wants* that car. By so doing you do more than just make a good sale — you sell *yourself;* add another customer to your own clientele.

Make note of this fact — there are two outstanding marks of true up-to-dateness in motor car equipment — Bendix New Automatic Clutch and Bendix B-K Vacuum Power Brakes.

If the car you sell has these units, explain them to prospects; emphasize their vital advantages; prove that it's a better automobile because of them — modern, more comfortable, a lot *safer.*

Bendix Automatic Clutch, with the new Cushion Control positively eliminates the evils of incorrect clutch operation — evils inherent in physical operation. Engagement is smooth, mechanically perfect, and always the same. There can never be any jerking or "grabbing." Life of clutch and clutch bearings is immeasureably prolonged.

B-K Vacuum Power Brakes are *necessary* today — the only safe and sane answer to lighter, faster cars, mounting speeds, better roads. "Car control" is the imperative need in today's driving.

Only power brakes do the job — and vacuum is beyond question the simplest, most exactly controllable, most reliable, most economical form of power for motor car brakes.

BK VACUUM POWER BRAKES
A BENDIX PRODUCT

Get the facts about these vitally important units; for your own advantage, for the sake of your own income. Any request for information and cooperation will have instant attention.

BRAGG-KLIESRATH CORPORATION

South Bend, Indiana

(Subsidiary of Bendix Aviation Corporation)